MoDOT & Patrol Employees' Retirement System

Annual Comprehensive Financial Report

For the Fiscal Year Ended June 30, 2023

Security for a Lifetime

MPERS

Serving those who keep us safe.

Missouri Department of Transportation and Highway Patrol Employees' Retirement System

A Component Unit of the State of Missouri

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MoDOT & Patrol Employees' Retirement System
A Component Unit of the State of Missouri

Annual Comprehensive Financial Report

For the Fiscal Year Ended June 30, 2023

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Missouri State Highway Patrol (MSHP)
Security for everyday life.

Introductory Section

November 6, 2023

To the Board of Trustees and System Members:

We are pleased to provide this *Annual Comprehensive Financial Report* (*Annual Report*), of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS), for the fiscal year ended June 30, 2023. This report is intended to provide MPERS' stakeholders with a thorough review of the System's operations for the past fiscal year. The material presented in this report has been prepared in a manner intended to be useful and informative to MPERS' members, the management of the Missouri Department of Transportation (MoDOT) and the Missouri State Highway Patrol (MSHP), and the elected officials of the state of Missouri.

MPERS is a defined benefit pension plan designed to be a valuable employee recruitment and retention tool for covered employers. It provides lifetime retirement benefits to eligible MoDOT and MSHP employees. The monthly retirement and survivor benefits MPERS provides are a valuable source of retirement income for the members we serve. These benefits, when combined with social security and personal savings, provide the foundation for our members to leave the workforce and enjoy their retirement years with the dignity they deserve.

The average monthly benefit of a new MPERS retiree in Fiscal Year 2023 retiring directly from active employment was $2,152, which equates to $25,824 per year. Given the increasing cost of living, this amount alone will not provide a comfortable life for the retiree. However, this monthly benefit and those provided by other traditional pension plans have a significant impact that reaches beyond the retirees served. Over the past 10 years alone, MPERS has paid over $2.58 billion in benefit payments to its members. Nearly 95% of these retirees and beneficiaries reside in Missouri, reinvesting their retirement dollars in housing, goods, and services. This reinvestment improves the local economy, which in turn, helps to fuel the state's overall economy. The result is that defined benefit pensions have a long-term positive impact on our economy and the lives of our members.

Report Contents and Structure:
This *Annual Report* complies with the statutory reporting requirements stipulated in sections 104.190, 104.1006, and 105.661 of the Missouri Revised Statutes, as amended.

To the best of our knowledge, the information presented is accurate in all material respects and is reported in a manner designed to fairly represent the financial position of the fund. Some amounts included in the financial statements and elsewhere may be based on estimates and judgments. These estimates and judgments are products of best business practices. The accounting policies followed in preparing the basic financial statements conform with U.S. generally accepted accounting principles. Financial information presented throughout the *Annual Report* is consistent with information displayed in the basic financial statements.

The MPERS Board of Trustees (Board) is ultimately responsible for the *Annual Report* and the basic financial statements. MPERS' executive director and staff prepare the information contained in the *Annual Report* and the financial statements to assist the Board in fulfilling its statutory duty.

Systems of internal controls and supporting procedures are maintained to provide assurances that transactions are authorized, assets are safe guarded, and proper records are maintained. These controls include standards in the hiring and training of employees, the establishment of an organizational structure, and the communication of policies and guidelines throughout the organization. Inherent limitations exist in all control systems. No evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud have been detected. The objective of internal controls is to provide reasonable assurance that the financial statements are free of any material misstatements, recognizing that the cost of a control should not exceed the benefit derived from it.

In accordance with section 104.190 RSMo., Williams-Keepers, LLC, an independent auditing firm, has audited the financial statements included in this report and has issued an unmodified opinion (i.e., no audit concerns relating to MPERS' financial statements). The opinion letter of Williams-Keepers, LLC is presented in the "Financial Section" of this Annual Report.

"Management's Discussion and Analysis" immediately follows the "Independent Auditors' Report" and provides an introduction, overview, and analysis of the basic financial statements.

Background Information:
MPERS was established by Senate Bill 66 in the 68th General Assembly. In accordance with this legislation, employees of MoDOT and MSHP became members of the retirement system on September 1, 1955. Effective October 1, 1955, the System accepted 109 retirements. Employees of MPERS became members of the System after passage of Senate Bill 371 in 2001.

The plan provisions have changed many times over the years. The System offers not only enhanced retirement and disability benefits, but also benefits for survivors of active and retired members, benefits for vested former members, and death benefits.

MPERS' 11-member Board is responsible for the oversight of the System. The trustees serve as fiduciaries and are responsible for selecting and retaining competent management. The trustees and management jointly establish sound policies and objectives, monitor operations for compliance, and oversee performance.

MPERS is considered a component unit of the state of Missouri for financial reporting purposes and, as such, the financial statements in this report are also included in the *State of Missouri's Annual Comprehensive Financial Report.*

Fiscal Year 2023 Highlights:
The fiscal year that just ended was unusual. This may sound like an odd statement, but it seems fitting for a year when staff were predominantly, but simply, carrying out approved policy. For many years leading to the present, MPERS has been in rapid pursuit of best and prevailing practices. As a result, there was always a push to update "this" or change "that" and usually it was something significant and material to the System and its operations. It was refreshing to have a year where the puzzle pieces seemed to fit together, and implementation of industry-standard policies and procedures was the year's overall theme. For an organization whose employees are continuously looking for ways to move the System forward, we do not expect to have many years like this one. It is nice, nonetheless, to reflect on some significant policy achievements that produced some important objectives this year.

First and foremost, MPERS can confidently state that retiree liabilities are fully funded for the first time in System history. Nearly 20 years ago, MPERS' Board of Trustees agreed to aggressively fund the plan to address this glaring financial shortfall. Progress was slow and deliberate, but it happened one step at a time. A sound, but difficult, funding policy accomplished this funding goal. Recently updated funding policies will now carry us to the ultimate funding objective – to have all liabilities fully funded.

Along with the Board-approved funding policies came higher than typical employer contribution rates. For the first time in over a decade, employer contribution rates for non-uniformed employees went down. Furthermore, there is a reasonable expectation that additional reductions in employer contribution rates are on the horizon. There is now proof that MPERS' prudent funding policies have done the job expected and we are glimpsing what normal funding costs will be in the not-so-distant future.

Last year, the Board of Trustees approved a five-year strategic plan. Several key planning objectives have already been completed and the plan is largely on schedule. A couple of completed or in process highlights from the plan include a review of cyber security, performance validation, assessment of staffing resources, and succession planning.

You may recall a cyber security audit was scheduled to be conducted last year. The excellent results of the audit have reinforced the diligence MPERS' staff and business partners place on this critical function. Overall, MPERS' cyber security practices were recognized as serving stakeholders well and compared favorably to much larger organizations with resources dedicated to cyber security. There is always room for improvement, and this is one area where considerable efforts will be made to protect the sensitive data and the assets of the System. With that in mind, we are significantly expanding our cyber security policies to further reinforce MPERS' prudent standards of practice.

Performance validation is another key planning objective that was initiated at the end of this fiscal year. Here again, MPERS strives to support results with independent, third-party evaluation and auditing so that stakeholders can trust MPERS' published results. To that end, an additional agreed upon procedure will be reviewed by the external auditor to be sure policies, statutes, practices, and results are all in agreement.

Good policies only work if you have the right people in place to effectively administer them. After much discussion and contemplation over the past couple of years, it became clear that MPERS was short on personnel to effectively implement the Board-approved investment policy. As a result, the Board approved three additional full-time investment positions. Although one of these approved positions remains vacant, the staffing resources for the investment team are the best they have ever had. It is also important to know how well our relatively small staff compares to other larger investment teams in terms of credentials, education, and experience.

Shifting from adding staff to the closely related challenges of recruitment and retention, these areas are as challenging as I have ever experienced. Fortunately, we were able to transition an existing full-time position from a more traditional office manager to a human resources officer. Albeit early, the addition of a human resources professional has supported recent recruitment efforts and will help MPERS maintain the goal of being an employer of choice. The human resources officer has also recently launched a plan of attack for dealing with anticipated succession planning as well as unexpected succession planning. There is no cure for turnover, particularly when it applies to tenured individuals with significant institutional knowledge, but we can smooth that transition by being proactive and prepared for such turnover so that existing staff's experience is better and our members are affected minimally, if at all, by any staffing changes.

The MPERS Board of Trustees is to be commended for making tough decisions during the past 20 years with an overall objective of making up for lost time in regard to past funding decisions. Establishing sound governance policies has been key to the evolution of the organization and the staff's ability to excel. There is more to do, but sound policy and diligent oversight has set the stage for continued growth and progress into the future.

Actuarial Funding Status:
MPERS' funding objective is to meet future benefit obligations of retirees and beneficiaries through investment earnings and payroll contributions that remain approximately level from generation to generation. Historical information relating to this objective is presented in the "Schedule of Funding Progress" in the "Actuarial Section" of this report. During the fiscal year ended June 30, 2023, MPERS' funded status, which covers 18,516 participants, increased by 2.64% to 68.97%.

Each year, an independent actuarial firm conducts a valuation study to determine the actuarial soundness of the Plan based on its long-term obligations and the sufficiency of current contribution levels to fund the liabilities over a reasonable timeframe. In MPERS' most recent valuation dated June 30, 2023; the actuary concluded that the System continues to be financed in accordance with actuarial standards using the level percent of payroll financing method. The actuary's conclusion is based upon the fact the employers are contributing to the System according to actuarially determined rates and presumes the continuation of payment of actuarially determined contributions. Additional information regarding the financial condition of the System can be found in the "Actuarial Section" of this report.

To address the System's underfunding situation, the Board has modified the actuarial funding policies over the course of the past 17 years. In June 2023, the Board amended the funding policy with the intent to continue to propel forward progress for both funding levels and contribution rates.

As of June 30, 2023, the funding policy has a 1-year closed amortization period for unfunded retiree liabilities and a 16-year closed amortization period for other unfunded liabilities.

On September 24, 2014, the Board adopted a Contribution Rate Stabilization Reserve Fund intended to further reinforce the aggressive funding policies noted in the policy above. The reserve fund is funded by maintaining employer contribution rates at present levels by applying investment gains to the reserve fund rather than decreasing employer contribution rates. When actuarial losses are experienced the reserve fund is used first rather than increasing employer contribution rates. The reserve fund provides a smoothing of the overall experience that further decreases the potential volatility of contributions for covered employers.

Investment Activities:
State statutes and other applicable laws require the System's fiduciaries to make investments using the same care, skill, and diligence that prudent investors acting in a similar capacity would use. In fulfilling this obligation, the Board has established an investment policy to clearly define the roles and responsibilities of the Board, staff, and consultants, and to ensure that System assets are invested in a diversified portfolio following prudent investment standards. The Board determines the broad asset allocation policies and return objectives of the Plan. To implement and execute these policies, the Board has retained investment staff, consultants, a master custodian, and other advisors.

As of June 30, 2023, MPERS' investment portfolio had a total fair value of $3.27 billion, representing a return of 8.88% for the fiscal year. Relative to MPERS' peer group, which is the InvestorForce Public Fund Universe, the 8.88% return for Fiscal Year 2023 ranked MPERS in the 55th percentile. The trailing three- and five-year performance of 13.97% and 9.50%, respectively, ranks MPERS in the top 1% of the peer group for both periods. The trailing 10- and 20-year performance of 9.27% and 8.32%, respectively, also ranks MPERS in the top 1% of the peer group for both periods.

Awards:
The GFOA (Government Finance Officers Association) awarded a Certificate of Achievement for Excellence in Financial Reporting to MPERS for its Fiscal Year 2022 *Annual Report*. MPERS has achieved this prestigious award every year since Fiscal Year 2005. The Certificate of Achievement is the highest form of recognition for excellence in state and local government financial reporting. To be awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized *Annual Report*. This report must satisfy both generally accepted accounting principles and applicable legal and GFOA reporting requirements.

A Certificate of Achievement is valid for a period of one year. We believe that our current *Annual Report* continues to meet the program's requirements, and therefore, we are submitting this report to GFOA to determine its eligibility for another certificate.

MPERS also received the Public Pension Coordinating Council's (PPCC) Public Pension Standards Award in recognition of meeting professional standards for plan design and administration. MPERS has received the Council's award each year since 2004. This award is presented by the PPCC, a confederation of the National Association of State Retirement Administrators, the National Conference on Public Employee Retirement Systems, and the National Council on Teacher Retirement.

MPERS' staff and Board is pleased to receive these prestigious awards for financial and professional standards of excellence and may be viewed after this transmittal letter.

Acknowledgements and Distribution:
This report, a product of the combined efforts of MPERS' staff and advisors, provides comprehensive and reliable information about the System, demonstrates compliance with legal provisions, and allows for the evaluation of responsible stewardship of the System's funds.

This report is provided to the governor, the state auditor, and the Joint Committee on Public Employee Retirement. It is also distributed electronically to all MoDOT divisions, district offices, MSHP general headquarters, and troop headquarters. These offices form the link between MPERS and its members, and their cooperation contributes significantly to the success of MPERS. We hope all readers of this report find it informative and useful. An electronic version of this report is available on the MPERS website at www.mpers.org/annual-reports.

We express our gratitude to the members of the Board, the staff, the consultants, and the many people who have worked so diligently to ensure the continued successful operation of MPERS. The steady, monthly benefit payments offered by defined benefit plans, like MPERS, provide peace of mind and security for retirees and their families. For over 65 years, MPERS has been committed to providing a foundation for financial security to plan participants through the delivery of quality benefits, exceptional member service and professional plan administration.

Respectfully submitted,

Scott Simon
Executive Director

Sue W. Cox
Board Chair

Government Finance Officers Association

Certificate of Achievement for Excellence in Financial Reporting

Presented to

Missouri Department of Transportation & Highway Patrol Employees' Retirement System

For its Annual Comprehensive
Financial Report
For the Fiscal Year Ended

June 30, 2022

Christopher P. Morrill

Executive Director/CEO

PPCC

Public Pension Coordinating Council

Public Pension Standards Award
For Funding and Administration
2022

Presented to

MoDOT & Patrol Employees' Retirement System

In recognition of meeting professional standards for
plan funding and administration as
set forth in the Public Pension Standards.

Presented by the Public Pension Coordinating Council, a confederation of

National Association of State Retirement Administrators (NASRA)
National Conference on Public Employee Retirement Systems (NCPERS)
National Council on Teacher Retirement (NCTR)

Alan H. Winkle

Alan H. Winkle
Program Administrator

MPERS is governed by an eleven-member Board of Trustees, as set out in Section 104.160 of the Missouri Revised Statues (RSMo.). Board members as of June 30, 2023:

MPERS
Serving those who keep us safe.

The executive director of MPERS has charge of the office and records of the System and hires employees as deemed necessary, subject to the approval of the Board of Trustees. The System employed nineteen full-time staff as of June 30, 2023.

BOARD OF TRUSTEES

- **Scott Simon** – Executive Director
  - **MEMBER & LEGAL SERVICES** – Greta Bassett-Seymour, Assistant Executive Director and General Counsel
    - Barbara Graessle – Executive Assistant
    - Mary Jordan – Senior Benefit Specialist
    - Gabrielle Lewis – Senior Benefit Specialist
    - Julie West – Communications Specialist
    - Bev Wilson – Benefit Audit Specialist
      - Angel Backes – Senior Account Technician
      - Tammy Kroll – Senior Account Technician
      - Leigh Love – Senior Account Technician
  - **INVESTMENTS** – Larry Krummen, Chief Investment Officer
    - Seth Kelly – Investment Manager
    - Jennifer Johnson – Investment Manager
      - Luke Fortson – Investment Officer
      - Rowan Walquist – Investment Analyst
      - Stephen Robbins – Investment Analyst
  - **FINANCIAL SERVICES** – Jennifer Even, Chief Financial Officer
    - Lindsey Harris-Funk – Assistant Chief Financial Officer
  - Katy Lacy – Human Resources Officer

Executive Team (left to right): Scott Simon (Executive Director), Jennifer Even (Chief Financial Officer), Larry Krummen (Chief Investment Officer), Greta Bassett-Seymour (Assistant Executive Director and General Counsel)

Director's Office

The Director's Office staff provides executive oversight for the System which includes, but is not limited to, administrative support in the areas of legislation, stakeholder communications, operations, facilities management, human resources, benefits, risk management, and investments. The Director's Office is also responsible for providing the Board with results, information, and reports on the activities of the System.

Financial Services

The Financial Services section is responsible for maintaining all the financial records of MPERS. The Financial Services section interacts with the investment custodian, the auditors, the depository bank, the Missouri Department of Revenue, and the Internal Revenue Service. In addition, they assist the Investments section in tracking and predicting target cash balances, participate in annual budget development, prepare monthly budget-to-actual reports, and calculate monthly premium payments to the long-term disability insurer. The Financial Services section also processes MPERS' semi-monthly office payroll, reconciles monthly benefit payments and contributions/payrolls posted, and reconciles investment activity.

Investments

The Investments section staff works closely with the general investment consultant to manage the investment portfolio and provide consulting services to the Board and the executive director. This includes, but is not limited to, the following: (a) formulating investment policy and asset recommendations; (b) sourcing, selecting, monitoring, and evaluating external investment advisors; (c) measuring and reporting investment performance; (d) conducting market research on political, financial, and economic developments that may affect the System; and (e) serving as a liaison to the investment community.

Legal Services

The Legal Services section advises the executive director and Board on legal matters, reviews and approves investment and other contracts for MPERS, advises staff on the application of state and federal statutes affecting the administration of plan benefits, responds to requests from members and their attorneys related to plan benefits, engages in or oversees litigation affecting MPERS, and assists in developing policies, rules, and legislation impacting MPERS' operations or the administration of plan benefits.

Member Services

The Member Services section consists of two units devoted to serving member needs.

The Benefits Unit is responsible for contact with the membership regarding the benefit programs administered by MPERS, which include retirement and disability. The benefits staff is responsible for preparing and delivering the pre-retirement, mid-career, and benefit basics seminars in addition to assisting with the development of member communication material. The benefits staff is the main point of contact for members who have questions about retirement.

The Payroll Unit is responsible for establishing and maintaining all membership records including the following: (a) maintaining member data in the pension administration system; (b) verifying retirement calculations; (c) balancing payroll deductions; (d) verifying SAMII data against exception reports; and (e) entering payroll, service, and leave data into the System's database. Payroll Unit staff will also create and publish communication materials, assist with pre-retirement seminars, provide data to the actuary, and review member records for accuracy and completeness.

The following firms were retained at fiscal year-end by the Board of Trustees to serve in professional capacities or provide consultant services. Please refer to pages 53 through 56 in the Investment Section for the Schedule of Investment Expenses and Brokerage Commissions for the investment professionals.

Actuary
- Gabriel, Roeder, Smith & Company

Auditor
- Williams-Keepers, LLC

Investment General Consultant
- NEPC

Information Technology
- Levi, Ray & Shoup, Inc.
- Midwest Computech, Inc.

Legislative Consultant
- Michael G. Winter Consultants, LLC

Master Trustee/Custodian
- The Northern Trust Company

Risk Management/Insurance Consultant
- Charlesworth Benefits

Long-Term Disability Insurer
- The Standard Insurance Company

Governance Consultant
- Funston Advisory Services, LLC

Investment Managers
- ABRY Partners
- Aisling Capital
- Albourne America
- American Infrastructure MLP
- American Timberlands Company
- Anchorage Capital Group
- Apollo Aviation Group
- Ares Management
- Arrowroot Capital
- Banner Ridge Partners
- Blackstone Alternative Asset Management
- Blackstone
- Blue Road Capital
- Bridgewater Associates
- Carlyle Aviation Partners
- CarVal Investors (CVI)
- Catchmark Timber
- CBRE Investors
- CenterSquare Investment Management
- CIM Group
- Clarion Partners
- Corrum Capital
- DC Capital
- Drive Capital
- Dyal Capital Partners
- Energy & Mineral Group
- Fortress Investment Group
- Francisco Partners
- Golden Sciens Marine Investments Limited
- Grey Rock Energy Partners
- Grove Street Advisors
- GSO Capital Opportunities
- Heartwood Partners
- Kennedy Capital
- KKR
- KPS Capital Partners
- Long Ridge Equity Partners
- Longford Capital Management
- Luxor Capital Group
- M&G Investments
- Mercato Partners
- MGG Investment Group
- Millennium Management
- Miravast
- Monomoy Capital Partners
- Natural Gas Partners
- New Mountain Capital
- NewQuest Capital Partners
- Nexus Capital Management
- Northern Shipping
- Oak Street Real Estate Group
- OCP Asia Limited
- Octagon Credit Investors
- OpenGate Capital
- Orion Mine Finance Group
- Owl Rock Capital Partners
- Parametric
- Pfingsten Partners
- PIMCO
- Principal Global Investors
- Quantum Energy Partners
- Ridgewood Energy
- Riverstone Credit Partners
- Sculptor Real Estate
- Shore Capital Partners
- Shoreline Capital
- Silver Point Capital
- Stockdale Capital Partners
- Timberland Investment Resources
- Torchlight Investors
- Tristan Capital Partners
- Turnbridge Capital Partners
- Varde Asia
- Vectis

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Missouri Department of Transportation (MoDOT)
Security for everyday travel.

Financial Section

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INDEPENDENT AUDITORS' REPORT

The Board of Trustees
Missouri Department of Transportation and
Highway Patrol Employees' Retirement System

Opinion

We have audited the accompanying statement of fiduciary net position of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (the System), as of June 30, 2023, and the related statement of changes in fiduciary net position for the year then ended, and the related notes to the financial statements, which collectively comprise the System's basic financial statements as listed in the table of contents.

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the System as of June 30, 2023, and the changes in fiduciary net position for the year then ended, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

We conducted our audit in accordance with U.S. generally accepted auditing standards. Our responsibilities under those standards are further described in the Auditors' Responsibilities of the Audit of the Financial Statements section of our report. We are required to be independent of the System and to meet our ethical responsibilities, in accordance with the relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a bases for our audit opinion.

Responsibilities of Management for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with U.S. generally accepted accounting principles; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statement, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the System's ability to continue as a going concern for twelve months beyond the financial statement date, including any currently known information that may raise substantial doubt shortly thereafter.

Auditors' Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with generally accepted auditing standards will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the financial statements.

In performing an audit in accordance with generally accepted auditing standards, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the System's internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.
- Conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about the System's ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control-related matters that we identified during the audit.

Required Supplementary Information

U.S. generally accepted accounting principles require that the management's discussion and analysis on pages 5 through 7 and the schedules of changes in the employers' net pension liability, employers' contributions, investment returns, changes in net OPEB liability and related ratios, MPERS' proportionate share of net OPEB liability, and related notes on pages 30 through 34 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with U.S. generally accepted auditing standards, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise the Systems' basic financial statements. The introductory, investment, actuarial and statistical sections as listed in the table of contents, and the schedule of administrative expenses, schedule of investment expenses, and the schedule of consultant and professional expenses on pages 35 through 37 are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The schedule of administrative expenses, schedule of investment expenses, and the schedule of consultant and professional expenses on pages 35 through 37 are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the financial statements. The information on pages 35 through 37 have been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with U.S. generally accepted auditing standards. In our opinion, the information on pages 35 through 37 is fairly stated in all material respects in relation to the basic financial statements as a whole.

The introductory, investment, actuarial and statistical sections have not been subjected to the auditing procedures applied in the audit of the basic financial statements.

Williams-Keepers LLC

Columbia, Missouri
November 3, 2023

The management of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (the System, or MPERS) provides this discussion and analysis of the System's financial performance for the fiscal year ended June 30, 2023. While this discussion is intended to summarize the financial status of MPERS, readers should consider this information in conjunction with the information that is furnished in the more detailed financial statements and corresponding notes.

DESCRIPTION OF BASIC FINANCIAL STATEMENTS

As required by the Governmental Accounting Standards Board (GASB) accounting standards, this financial report consists of Management's Discussion and Analysis (this section), the basic financial statements (including notes to the basic financial statements), and other required supplementary information.

Financial Statements report information about MPERS, using accounting methods similar to those used by private-sector companies, by using the economic resources measurement focus and accrual basis of accounting. These statements provide both long-term and short-term information about the System's overall financial status. These statements follow this Management's Discussion and Analysis section:

- The *Statement of Fiduciary Net Position* includes all the System's assets and deferred outflows of resources, and liabilities and deferred inflows of resources, with the difference reported as net position.
- The *Statement of Changes in Fiduciary Net Position* accounts for all the current year's additions (income) and deductions (expenses), regardless of when cash is received or paid.

Notes to the Financial Statements are included following the financial statements. The notes to the financial statements provide additional information that is essential for a full understanding of the data provided in the financial statements.

Required Supplementary Information follows the notes and further supports the information in the financial statements.

Supplementary Information follows the required supplementary information and provides additional detailed administrative and investment expense information.

ANALYSIS OF FINANCIAL POSITION AND RESULTS OF OPERATIONS

Overall, the financial position of MPERS increased by $214.4 million, reported as the "net increase". This is primarily a result of the increase in the fair value of investments for the year ended June 30, 2023. The funded status of the plan showed an increase of 2.64%, primarily due to positive investment returns.

The following schedules present summarized comparative data from the System's financial statements for each of the fiscal years ended June 30, 2023 and 2022. Following each schedule is a brief summary providing explanation and analyses of the major reasons for changes in the condensed financial statements.

Summarized Comparative Statements of Fiduciary Net Position

	As of June 30, 2023	As of June 30, 2022	% Change 2023 / 2022
Cash and Receivables	$ 43,820,838	$ 119,368,464	-63.3
Investments	3,266,926,550	3,058,469,276	6.8
Invested Securities Lending Collateral	18,946,422	23,800,466	-20.4
Capital Assets	536,438	388,915	37.9
Total Assets	**3,330,230,248**	**3,202,027,121**	**4.0**
Deferred Outflows of Resources	**398,255**	**513,253**	**-22.4**
Accounts Payable	27,290,762	108,303,592	-74.8
OPEB Obligation	1,929,126	2,367,620	-18.5
Securities Lending Collateral	19,284,048	24,560,325	-21.5
Total Liabilities	**48,503,936**	**135,231,537**	**-64.1**
Deferred Inflows of Resources	**496,723**	**115,751**	**329.1**
Net Position Restricted for Pensions	**$3,281,627,844**	**$3,067,193,086**	**7.0**

The decrease in cash and receivables is primarily attributable to a decrease of investment sales receivable as of June 30, 2023. Fluctuations in this area are normal, based on investment activity.

The System's investments represent the main component of total assets. These investments include equities, fixed income, limited partnerships, hedge funds, and short-term investments. The increase in fair value of investments as of June 30, 2023, is a result of the positive investment performance during the fiscal year. The fiscal year 2023 investment return was 8.88% as calculated on a time-weighted rate of return methodology.

Capital assets increased in fiscal year 2023 due to additional improvements made to a recently purchased parcel of land adjacent to the MPERS office.

Deferred outflows of resources are related to Other Post-Employment Benefits (OPEB), required by Governmental Accounting Standards Board (GASB) Statement 75. The deferred outflows of resources relate to the timing of contributions paid and changes in assumptions.

The largest component of liabilities in fiscal year 2023 is accounts payable. The decrease in accounts payable for fiscal year 2023 is attributable to lower investment purchases payable. Fluctuations in this area are normal, based on investment activity. Another component of liabilities is securities lending collateral. This represents the amount owed for collateral to be returned as the result of investment securities lent. The corresponding securities lending collateral asset is valued at a lower amount than the securities lending collateral liability due to the fair value of the securities on loan being less than the collateral value.

Deferred inflows of resources are related to OPEB. The deferred inflows of resources relate primarily to the amortization of changes in actuarial assumptions.

The System's net position restricted for pensions was $3.282 billion as of June 30, 2023, a $214.4 million increase from the $3.067 billion net position as of June 30, 2022.

Summarized Comparative Statements of Changes in Fiduciary Net Position

	Year Ended June 30, 2023	Year Ended June 30, 2022	% Change 2023 / 2022
Contributions	$ 244,262,169	$ 225,366,897	8.4
Net Investment Income	264,756,429	122,767,485	115.7
Other Income	1,954	195	902.1
Total Additions	**509,020,552**	**348,134,577**	**46.2**
Benefits	289,056,536	279,637,701	3.4
Administrative Expenses	5,529,258	5,229,018	5.7
Total Deductions	**294,585,794**	**284,866,719**	**3.4**
Net Increase	214,434,758	63,267,858	238.9
Net Position – Beginning	3,067,193,086	3,003,925,228	2.1
Net Position – Ending	**$3,281,627,844**	**$3,067,193,086**	**7.0**

Net investment income, a primary component of plan additions, was $264.8 million for fiscal year 2023, which represented an 8.88% return for the fiscal year ended June 30, 2023. In comparison, the fiscal year 2022 income of $122.8 million represented an investment return of 3.94%. Annual fluctuations within the broad investment markets are outside the control of the System and are expected to fluctuate from year to year. Fiscal year 2023 was a good year as MPERS outperformed its policy index by 2.44%, building on the exceptional fiscal year 2022 investment return of 3.94% which outperformed the policy index by 8.28%. The Board of Trustees has approved a diversified asset allocation that, over long periods of time, is expected to realize the assumed actuarial rate of investment return of 6.50%.

Total benefits increased in fiscal year 2023 by $9.4 million from fiscal year 2022 due to inflation driving up the annual cost-of-living adjustment (COLA) and due to an increase in the total number of retirees.

The increase in fiscal year 2023 administrative expenses is due to inflation putting upward pressure on the annual cost of living adjustment causing higher personnel and related benefit expenses.

CURRENTLY KNOWN FACTS AND RECENT EVENTS

Based on the June 30, 2023 actuarial valuation, the Board of Trustees approved a decrease to the required state contribution rate for non-uniformed payroll (MoDOT, civilian patrol, and MPERS) to 52.01%, effective July 1, 2024. The rate approved for uniformed patrol increases to 58.49%.

Based on the June 30, 2022 actuarial valuation, the Board of Trustees approved a decrease to the required state contribution rate for uniformed patrol of 58.00%, effective July 1, 2023. The rate applied to non-uniformed payroll (MoDOT, civilian patrol, and MPERS) remained at 58.00%.

CONTACTING THE RETIREMENT SYSTEM'S MANAGEMENT

This financial report is designed to provide a general overview of the System's finances. Questions about this report or requests for additional financial information should be sent to:

MoDOT and Patrol Employees' Retirement System
PO Box 1930
Jefferson City, MO 65102-1930
mpers@mpers.org

Statement of Fiduciary Net Position

As of June 30, 2023

ASSETS	
Cash	$ 590,877
Receivables	
Contributions	10,547,288
Accrued Interest and Income	13,449,780
Investment Sales	19,229,893
Other	3,000
Total Receivables	43,229,961
Investments, at Fair Value	
Equities	168,719,607
Fixed Income	1,104,543,056
Limited Partnerships	1,732,300,726
Hedge Funds	29,572,393
Short-Term Investments	231,790,768
Total Investments	3,266,926,550
Invested Securities Lending Collateral	18,946,422
Capital Assets, Net of Depreciation	
Land	188,319
Building and Improvements	745,828
Furniture, Equipment, and Software	3,445,854
Accumulated Depreciation	(3,843,563)
Capital Assets, Net of Depreciation	536,438
TOTAL ASSETS	**$3,330,230,248**
DEFERRED OUTFLOWS OF RESOURCES	**$ 398,255**
LIABILITIES	
Accounts Payable	$ 2,872,218
OPEB Obligation	1,929,126
Security Lending Collateral	19,284,048
Investment Purchases	24,418,544
TOTAL LIABILITIES	**$ 48,503,936**
DEFERRED INFLOWS OF RESOURCES	**$ 496,723**
NET POSITION RESTRICTED FOR PENSIONS	**$3,281,627,844**

See accompanying Notes to the Financial Statements.

Statement of Changes in Fiduciary Net Position

For the Year Ended June 30, 2023

ADDITIONS	
Contributions	
Employer	$ 232,813,995
Employee	6,838,152
Service Transfers from Other System	4,036,789
Other	573,233
Total Contributions	244,262,169
Investment Income from Investing Activities	
Net Appreciation in Fair Value of Investments	181,763,970
Interest and Dividends	115,234,758
Investment Expenses	(32,438,336)
Net Investment Gain	264,560,392
Income from Securities Lending Activities	
Securities Lending Gross Income	899,968
Securities Lending Expenses, net	(703,931)
Net Income from securities Lending Activities	196,037
Other Income	1,954
TOTAL ADDITIONS	**$ 509,020,552**
DEDUCTIONS	
Benefits Expenses	
Retiree and Survivor Annuity Benefits	$ 265,534,764
BackDROP Payments	15,605,731
Disability Benefits	2,561,170
Death Benefits	1,065,000
Service Transfer Payments	3,317,630
Employee Contributions Refunds	972,241
Total Benefits Expenses	289,056,536
Administrative Expenses	5,529,258
TOTAL DEDUCTIONS	**$ 294,585,794**
NET INCREASE	$ 214,434,758
NET POSITION RESTRICTED FOR PENSIONS	
Beginning of Year	**$3,067,193,086**
End of Year	**$3,281,627,844**

See accompanying Notes to the Financial Statements.

NOTE 1 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

As established under Section 104.020 of the Revised Statutes of Missouri (RSMo.), the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS) is a body corporate and an instrumentality of the State of Missouri (State). Due to the nature of MPERS' reliance on funding from the Missouri Department of Transportation (MoDOT) and the Missouri State Highway Patrol (MSHP) and control of the overall plan document by the legislative and executive branches of state government, MPERS is considered a part of the State of Missouri financial reporting entity and is included in the State's financial reports as a component unit shown as a pension trust fund.

Note 1 (a) - Basis of Accounting

The financial statements were prepared using the accrual basis of accounting. Contributions are due to MPERS when employee services have been performed. Contributions are recognized as revenues when due, pursuant to statutory requirements. Benefits are recognized when due and payable and expenses are recorded when the corresponding obligations are incurred. Dividend income is recognized when dividends are declared. Interest income is recognized when earned.

Note 1 (b) - Method Used to Value Investments

Investments are reported at fair value on a trade date basis. Bonds and stocks traded on a national or international exchange are valued at the reported sales price at current exchange rates. Mortgages are valued on the basis of future principal and interest payments and are discounted at prevailing interest rates for similar instruments. The fair value of real estate and timber investments are based on net asset value estimates provided by the general partners' administrators or portfolio managers, which are compared to independent appraisals. Investments that do not have an established market are reported at estimated fair value. The fair value of the hedge fund portfolios and partnership portfolios are based on valuations of the underlying assets as reported by the general partner or portfolio manager.

Note 1 (c) - Net Investment in Capital Assets

MPERS capitalizes assets with an expected useful life greater than one year and a cost greater than $5,000. Capital assets are depreciated on the straight-line method over the estimated useful lives of the related assets. The estimated useful lives are as follows:

Furniture, Equipment and Software	3-10 years
Building and Improvements	30 years

Note 1 (d) - Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

NOTE 2 – PLAN DESCRIPTIONS AND CONTRIBUTION INFORMATION

MPERS is a body corporate and an instrumentality of the state as a multiple-employer, public employee retirement system with one plan that has three benefit structures known as the Closed Plan, the Year 2000 Plan, and the Year 2000 Plan-2011 Tier. The plan provides retirement, survivor, and disability benefits for employees of MoDOT, MSHP, and MPERS. The plan is administered in accordance with the requirements of a cost sharing, multiple-employer, public employee retirement plan under the Revised Statutes of Missouri. In MPERS are vested the powers and duties specified in sections 104.010 to 104.312, 104.601 to 104.805, and 104.1003 to 104.1093, RSMo., and such other powers as may be necessary or proper to enable it, its officers, employees, and agents to carry out fully and effectively all the purposes outlined pursuant to these sections. Responsibility for the operation and administration of the System is vested in the Board of Trustees, which consists of eleven members, four elected by the active and retired plan members, three Highway and Transportation Commissioners, a State Senator appointed by the President pro tem of the Senate, a State Representative appointed by the Speaker of the House, and the MoDOT Director and MSHP Superintendent who serve as ex-officio members. Detailed information regarding contributions can be found in Note 5.

Generally, all covered employees hired before July 1, 2000, are eligible for membership in the Closed Plan. All covered employees hired on or after July 1, 2000, and before January 1, 2011, are eligible for membership in the Year 2000 Plan. All covered employees hired on or after January 1, 2011, are eligible for membership in the Year 2000 Plan's 2011 Tier.

Membership in the Closed Plan, Year 2000 Plan, and 2011 Tier as of June 30, 2023

	Closed	Year 2000	Tier 2011	Total
Retirees, Beneficiaries, and Disabilities Currently Receiving Benefits	4,769	4,805	76	9,650
Terminated Employees Entitled to But Not Yet Receiving Benefits	842	1,027	375	2,244
Active Employees				
Vested	1,296	1,871	1,514	4,681
Non-Vested	3	40	1,898	1,941
Total Membership	**6,910**	**7,743**	**3,863**	**18,516**

Closed Plan Description

Employees covered by the Closed Plan are fully vested for benefits upon receiving 5 years of creditable service. Under the Closed Plan, MoDOT and civilian employees may retire with full benefits upon the earliest of attaining:

- Age 65 with 4 or more years of creditable service (active);
- Age 65 with 5 or more years of creditable service (terminated & vested);
- Age 60 with 15 or more years of creditable service (active or terminated & vested); or
- "Rule of 80" – at least age 48 with sum of member's age and service equaling 80 or more (active or terminated & vested).

The following provisions apply for uniformed patrol members of the Closed Plan:

- Age 55 with 4 or more years of creditable service (active);
- Age 55 with 5 or more years of creditable service (terminated & vested);
- "Rule of 80" – at least age 48 with sum of member's age and service equaling 80 or more (active or terminated & vested); or
- Mandatory retirement at age 60 (active).

All non-uniformed members may retire early, with reduced benefits, at age 55 with at least 10 years of creditable service.

The base benefit in the Closed Plan is equal to 1.6% multiplied by the final average pay multiplied by years of creditable service. For members of the uniformed patrol, the base benefit is calculated by applying the same formula, then multiplying the product by 1.333333.

Retired uniformed members will receive an additional benefit of $90 per month, plus cost-of-living adjustments (COLAs), until attainment of age 65. This payment, however, is reduced by any amount earned during gainful employment. This benefit is not available to uniformed members hired on or after January 1, 1995, or to vested deferred members.

For members employed prior to August 28, 1997, COLAs are provided annually based on 80% of the increase in the consumer price index for all urban consumers for the United States (CPI-U). The minimum rate is 4% and the maximum rate is 5%, until the cumulative amount of COLAs equals 65% of the original benefit. Thereafter, the 4% minimum rate is eliminated, and the annual COLA rate will be equal to 80% of the increase in the CPI-U (annual maximum of 5%). For members employed on or after August 28, 1997, COLAs are provided annually based on 80% of the increase in the CPI-U, up to a maximum rate of 5%.

The BackDROP is a payment option that is available to eligible members upon retirement. This option provides for a benefit to be calculated as if the member elected to retire at a previous date. If the BackDROP is elected, the monthly benefit payable on the actual retirement date is based on the benefit that would have been received by the member had he/she left employment and retired on the BackDROP date. In addition, the member will receive a lump sum payment equal to 90% of the life income annuity amount the member would have received during the BackDROP period. This lump sum amount includes any COLAs and other benefit increases; also, credit will be received for the unused sick leave balance as of the date of retirement.

The life income annuity payment option (which contains no provision for survivorship) and the life income with 60 or 120 month guaranteed payment options are available to all members. Joint and 50% or 100% survivor options are available if married at the time of retirement. In the Closed Plan, the reduction for the joint & 100% survivor option is based on the difference between the age of the member and the survivor. There is no reduction for the joint and 50% survivor option.

If a reduced joint and survivor option is chosen at the time of retirement and the spouse precedes the member in death, the benefit will revert back (pop-up) to a normal annuity, upon appropriate notification to MPERS.

Members may name a new spouse as beneficiary if:

- They were single at retirement and since married;
- They elected a spouse option at the time of retirement, the spouse preceded the member in death, and then a remarriage occurred.

The member has 1 year from the date of marriage to re-elect a payment option and name a new spouse.

All members who retire from active employment or long-term disability, or begin receiving normal or work-related disability benefits, on or after September 28, 1985, are provided a $5,000 death benefit payable to designated beneficiaries.

Year 2000 Plan Description

Employees covered by the Year 2000 Plan are fully vested for benefits upon earning 5 years of creditable service. Under the Year 2000 Plan, MoDOT and civilian employees may retire with full benefits upon the earliest of attaining:

- Age 62 and with 5 or more years of creditable service (active or terminated & vested);
- "Rule of 80" – at least age 48 with sum of member's age and service equaling 80 or more (active).

The following provisions apply for uniformed patrol members of the Year 2000 Plan:

- "Rule of 80" – at least age 48 with sum of member's age and service equaling 80 or more (active);
- Mandatory retirement at age 60 (active only).

All members may retire early with reduced benefits at age 57 with at least 5 years of creditable service.

The base benefit in the Year 2000 Plan is equal to 1.7% multiplied by the final average pay multiplied by years of creditable service. Members retiring under the Rule of 80, and uniform patrol members retiring at the mandatory retirement age (currently 60), receive an additional temporary benefit until age 62. The temporary benefit is equivalent to 0.8% multiplied by final average pay multiplied by years of creditable service.

COLAs are provided annually based on 80% of the increase in the CPI-U, up to a maximum rate of 5%.

The BackDROP is a payment option that may be available to members upon retirement. This option provides for a monthly benefit to be calculated as if the member elected to retire at a previous date. If the BackDROP is elected, the monthly benefit payable on the actual retirement date is based on the benefit that would have been received by the member had he/she left employment and retired on the BackDROP date. In addition, the member will receive a lump sum payment equal to 90% of the life income annuity amount the member would have received during the BackDROP period. This lump sum amount includes any temporary benefits, COLAs, and other benefit increases; also, credit will be received for the unused sick leave balance as of the date of retirement.

The life income annuity payment option (with no provision for survivorship) and the life income with 120 or 180 months guaranteed payment options are available to all members. Joint and 50% or 100% survivorship options are available if married at the time of retirement. The reduction for the joint and 50% or 100% survivor options is based on the member's age at retirement, as well as the age difference between the member and the survivor.

If a reduced joint and survivor option is chosen at the time of retirement and the spouse precedes the member in death, the benefit will revert back (pop-up) to a normal annuity, upon appropriate notification to MPERS.

Members may name a new spouse for survivor benefits if:
- They were single at retirement and since married;
- They elected a spouse option at the time of retirement, the spouse preceded the member in death, and then a remarriage occurred.

The member has 1 year from the date of marriage to re-elect the payment option and name a new spouse.

All members who retire from active employment or long-term disability, or begin receiving work-related disability benefits, on or after July 1, 2000, are provided a $5,000 death benefit payable to designated beneficiaries.

Year 2000 Plan-2011 Tier Description

Employees covered by the 2011 Tier are fully vested for benefits upon earning 5 years of creditable service if they were active on or after January 1, 2018. Under the 2011 Tier, MoDOT and civilian employees may retire with full benefits upon the earliest of attaining:
- Age 67 and with 5 or more years of creditable service (active or terminated & vested);
- "Rule of 90" – at least age 55 with sum of member's age and service equaling 90 or more (active only).

Active MoDOT and civilian employees may retire early with reduced benefits at age 62 with at least 5 years of creditable service. The following provisions apply for uniformed patrol members of the 2011 Tier:
- Age 55 and with 5 or more years of creditable service (active only);
- Mandatory retirement at age 60 with no minimum service amount (active only).

Terminated and vested uniformed patrol employees may retire at age 67 with 5 or more years of creditable service.

The base benefit in the 2011 Tier is equal to 1.7% multiplied by the final average pay multiplied by years of creditable service. Members retiring under the Rule of 90, and uniform patrol members retiring at the mandatory retirement age (currently 60) or at age 55 with 5 years of creditable service, receive an additional temporary benefit until age 62. The temporary benefit is equivalent to 0.8% multiplied by final average pay multiplied by years of creditable service.

COLAs are provided annually based on 80% of the change in the CPI-U, up to a maximum rate of 5%.

The life income annuity payment option (with no provision for survivorship) and the life income with 120 or 180 months guaranteed payment options are available to all members. Joint and 50% or 100% survivorship options are available if married at the time of retirement. The reduction for the joint and 50% or 100% survivor options is based on the member's age at retirement, as well as the age difference between the member and the survivor.

If a reduced joint and survivor option is chosen at the time of retirement and the spouse precedes the member in death, the benefit will revert back (pop-up) to a normal annuity, upon appropriate notification to MPERS.

Members may name a new spouse for survivor benefits if:
- They were single at retirement and since married;
- They elected a spouse option at the time of retirement, the spouse preceded the member in death, and then a remarriage occurred.

The member has 1 year from the date of marriage to re-elect the payment option and name a new spouse.

All members who retire from active employment or long-term disability, or begin receiving work-related disability benefits, on or after January 1, 2011, are provided a $5,000 death benefit payable to designated beneficiaries.

Contributions

Beginning January 1, 2011, employee contributions of 4% of gross pay are required for those covered by the Year 2000 Plan-2011 Tier.

Employer contributions are determined through annual actuarial valuations. Administrative expenses are financed through contributions from participating employers and investment earnings.

Participating employers are required to make contributions to the plan based on the actuarially determined rate. Detailed information regarding contributions can be found in Note 5.

NOTE 3 – DEPOSITS AND INVESTMENTS

The Board of Trustees has established policies and procedures by which funds are invested. Section 104.150, RSMo., provides the authority for the Board to invest MPERS funds. Plan assets are invested in a diversified portfolio following prudent standards for preservation of capital, with the goal of achieving the highest possible rate of return consistent with MPERS' tolerance for risk. The Board of Trustees establishes MPERS' asset allocation policy and may amend the policy. The following is MPERS' current asset allocation policy:

Asset Class	Target Allocation
Public Equity	40.0%
Private Equity	10.0%
Traditional Fixed Income	22.5%
Opportunistic Debt	7.5%
Real Assets	10.0%
Real Estate	10.0%
Cash	0.0%

Note 3 (a) - Deposit and Investment Risk Policies

Concentration of Credit Risk

Concentration of credit risk is the risk of loss attributed to the magnitude of the System's investment in a single issuer. Within the traditional asset classes (equities and fixed income), the consultant will aggregate exposures across asset classes to create measures of concentration including industries, countries, and security issuer for Investment staff review.

Investment Custodial Credit Risk

Custodial credit risk is an investment risk that, in the event of the failure of the counterparty to a transaction, the System will not be able to recover the value of its investment or the collateral securities that are in the possession of an outside party. Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in the name of the System, and are held by either: a) the counterparty or b) the counterparty's trust department or agent but not in the System's name. It is the policy of the System to require that all investments be clearly marked as to ownership and, to the extent possible, shall be registered in the name of the System.

Cash Deposit Custodial Credit Risk

Cash deposit custodial credit risk is the risk that, in the event of the failure of depository financial institution, the System will not be able to recover deposits or will not be able to recover collateral securities that are in the possession of an outside party. Missouri state law requires that all public funds must be collateralized with acceptable securities having fair values of at least 100% of the amount of funds on deposit (less any amount covered by FDIC insurance).

Market Risk

Market risk is the risk that the fair value of an investment will be adversely impacted due to a change in value of the underlying market. The three primary market risks prevalent in the System's investment portfolio are equity prices, interest rates, and foreign currencies. Equity risk is the risk that stock prices fall and/or the volatility in the equity market increases. Interest rate risk is the risk

that fixed income securities (or any investment primarily valued on a yield basis) will drop in value due to an increase in interest rates. Currency risk is the risk that changes to foreign exchange rates will adversely impact the fair value of non-U.S. Dollar denominated assets. The System protects the portfolio against market risks by adopting a diversified asset allocation that limits the amount of exposure to each underlying market risk. Market risks are also controlled by monitoring the types, amounts, and degree of risk that each investment manager takes for their specific mandate.

Investment Credit Risk

Investment credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations. Unless authorized under a separate Investment Management Agreement or operating agreement, it is the policy of the System to limit fixed income managers to purchasing securities that possess a minimum credit rating of "Baa" by Moody's and "BBB" by Standard & Poor's. Issues subsequently downgraded below these ratings must be brought to the attention of the Chief Investment Officer. Where counterparty risk is present, the System's investment managers seek to control credit risk through counterparty credit evaluations and approvals, counterparty credit limits and exposure monitoring procedures.

Note 3 (b) - Cash Deposits

Cash balances include short-term securities held by the custodial bank to meet future obligations and operating balances held by the depository bank. As of June 30, 2023, MPERS had a carrying amount of deposits of $590,877, and a bank balance of $864,060. The FDIC covered $250,000 of the bank balance with the remaining balance being fully collateralized.

Note 3 (c) – Concentrations

No investments in any one organization (other than those issued or sponsored by the U.S. government and those in pooled investments) represent 5% of plan net position.

Note 3 (d) – Rate of Return

For the year ended June 30, 2023, the annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was 8.87%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

Note 3 (e) – Investments

The following table shows MPERS' investments by type.

Summary of Investments by Type as of June 30, 2023

	Carrying Amount	Fair Value
Equities	$ 162,044,696	$ 168,719,607
Fixed Income	1,146,167,516	1,104,543,056
Limited partnerships	1,500,911,586	1,732,300,726
Hedge	23,853,108	29,572,393
Short Term Securities	231,764,230	231,790,768
Securities Lending Collateral	18,946,422	18,946,422
Total Investments	**$3,083,687,558**	$3,285,872,972
Reconciliation to Statement of Fiduciary Net Position:		
Less: Securities Lending Collateral		(18,946,422)
Investments per Statement of Fiduciary Net Position		**$3,266,926,550**

Certain investments are not listed on national exchanges, over-the-counter markets, nor do they have quoted market prices. Their valuation is based on the most current net asset values, independent appraisals, and/or good faith estimates of the investment's fair value provided by the general partner or portfolio manager, cash flow adjusted through fiscal year end. The estimated fair value of these investments may differ significantly from values that would have been used had a ready market existed. The following investments were priced using those methods and comprised 57.00% of the total fair value of the System's investments as of June 30, 2023:

	Fair Value
Hedge Funds	$ 29,572,393
Limited Partnerships	1,732,300,726
	$1,761,873,119

Note 3 (f) – Fair Value Measurements

MPERS categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. The hierarchy is based on the valuation inputs used to measure the fair value of the asset and give the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (level 1 measurements) and the lowest priority to unobservable inputs (level 3 measurements).

Level 1: Unadjusted quoted prices for identical instruments in active markets.

Level 2: Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations in which all significant inputs are observable.

Level 3: Values derived from valuation techniques in which significant inputs are unobservable. Investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient are not classified in the fair value hierarchy.

Investments Measured at Fair Value, June 30, 2023

Investments by Fair Value Level	**Fair Value**	**Level 1**	**Level 2**	**Level 3**
Short Term Securities	$ 228,714,380	$ 358,814,380	$ 0	$ (130,100,000)*
Debt Securities				
Collateralized Debt Obligations	548,070,780	0	291,871,425	256,199,355
Commercial Mortgage-Backed Securities	250,436,099	0	174,049,134	76,386,965
Corporate Bonds	6,620,868	0	5,784,124	836,744
Government Commercial Mortgage-Backed Securities	6,314,954	0	5,928,771	386,183
Government Mortgage-Backed Securities	41,170,026	0	16,934,924	24,235,102
Municipal Bonds	125,381,655	0	58,504,777	66,876,878
U.S. Government Agencies	47,562,111	0	47,562,111	0
U.S. Treasury Securities	47,248,886	0	47,248,886	0
Funds – Corporate Bonds	10,292,721	10,292,721	0	0
Total Debt Securities	1,083,098,100	10,292,721	647,884,152	424,921,227
Equity Securities				
Communication Services	106,063	106,063	0	0
Consumer Discretionary	186,340	186,340	0	0
Consumer Staples	418,678	418,678	0	0
Energy	210,083	210,083	0	0
Financials	56,248,620	53,819,000	2,429,620	0
Health Care	5,908,661	5,908,661	0	0
Industrials	2,701,067	2,701,067	0	0
Information Technology	1,330,359	1,330,359	0	0
Materials	116,654	116,654	0	0
Real Estate	39,517,741	39,517,741	0	0
Total Equity Securities	106,744,266	104,314,646	2,429,620	0
Private Markets				
Opportunistic Debt	335,935,381	19,521,566	1,988,290	314,425,525
Private Equity	454,568,107	(124,306)	0	454,692,413
Real Assets	460,827,715	7,788,358	0	453,039,357
Real Estate	252,386,425	8,930,479	0	243,455,946
Total Private Markets	1,503,717,628	36,116,097	1,988,290	1,465,613,241
Investment Derivative Instruments				
Swaps	11,967,993	10,619,931	1,348,062	0
Total Investment Derivative Instruments	11,967,993	10,619,931	1,348,062	0
Total Investment by Fair Value Level	$2,934,242,367	**$ 520,157,775**	**$ 653,650,124**	**$1,760,434,468**
Investments Measured at Net Asset Value				
Global Asset Allocation	7,400,021			
In-Liquidation	444,473			
Multi-Strategy	263,040,242			
Opportunistic Debt	7,198,067			
Private Real Estate Fund	62,830,073			
Structured Credit - Relative Value	11,706			
Total Investments Measured at Net Asset Value	340,924,582			
Total Investments	**$3,275,166,949**			
Reconciliation to Statement of Fiduciary Net Position				
Total Investments Measured at Fair Value and Derivatives	$3,275,166,949			
Investment Sales Receivable	(19,229,893)			
Investment Purchases Payable	24,418,544			
Accrued Interest and Income	(13,449,780)			
Accrued Expenses	20,730			
Total Investments per Statement of Fiduciary Net Position	**$3,266,926,550**			

**Line of credit revolving loan as authorized by MPERS investment policy. Please refer to Note 12 for additional information.*

Investments listed as level 1 include securities and futures contracts where the price comes from an exchange.

Investments listed as level 2 include securities where an independent pricing evaluator had direct observable information including: trading volume, multiple sources of market data and benchmark spreads. The equity index swap is included because the valuation inputs include an observable interest rate and the underlying index.

Investments listed as level 3 include securities where an independent pricing evaluator did not have direct observable information and had limited market information for comparable securities. Significant inputs used in the valuation are not available aside from the evaluator providing the price. Direct investments in private equity, real estate, credit, and real assets are included because the valuation techniques utilize discounted cash flows or other non-observable market information by manager.

Private Markets Measured at Fair Value as of June 30, 2023

Private Markets	**Fair Value**	**Unfunded Commitments**
Private Equity	$ 454,568,107	$ 148,139,341
Real Estate	252,386,425	173,194,232
Real Assets	460,827,715	63,859,968
Opportunistic Debt	335,935,381	221,263,211
Total Private Markets	**$ 1,503,717,628**	**$ 606,456,752**

Private Markets

Private equity, real estate, real assets, and opportunistic debt are the four asset classes that fall into the category of private market funds. These funds invest in the equity or debt of private companies.

Private Equity: The private equity portfolio includes 31 direct fund investments and three fund of fund investments. These funds mostly invest in private companies adding value through operational or industry expertise and vast networks. The majority of the private equity allocation is in buyout funds with a smaller portion in venture capital and growth equity funds. These funds are not eligible for redemption. Distributions are received as underlying investments within the funds are liquidated, which on average can occur over the span of six to ten years.

Real Estate: The real estate portfolio consists of 24 real estate funds. The noncore real estate book includes 20 real estate funds that invest in value-add or opportunistic strategies. These funds are not eligible for redemption. Distributions are received as underlying investments within the funds are liquidated, which on average can occur over the span of six to ten years. The remaining four investments are in core real estate funds. Three of these funds are open-ended. Three are eligible for redemption on a quarterly basis and one on a daily basis.

Real Assets: The real asset portfolio contains 34 funds that invest in private energy, aviation, mining, and shipping companies. The timber portfolio, which includes both ownership in timber funds and direct timber investments, is also within the real assets portfolio. The timber portfolio has 12 direct timber investments. These funds and investments are not eligible for redemption. Distributions are received as underlying investments and investments within the funds are liquidated, which on average can occur over the span of six to ten years.

Opportunistic Debt: The opportunistic debt portfolio, comprised of 35 funds, provides financing to various companies. While this portfolio has a U.S. bias, some funds invest internationally with exposures in Europe and Asia. These funds are not eligible for redemption. Distributions are received as underlying investments within the funds are liquidated, which on average can occur over the span of three to five years.

Investments Measured at Net Asset Value as of June 30, 2023

Investments at Net Asset Value	Net Asset Value	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period
Global Asset Allocation	$ 7,400,021	$ 0	Monthly	5-60 days
In-Liquidation	444,473	0	In Liquidation	
Multi-Strategy	263,040,242	0	Monthly	60-90 days
Opportunistic Debt	7,198,067	0	Quarterly	45 days
Structured Credit – Relative Value	11,706	0	Quarterly	60 days
Private Real Estate Funds	62,830,073	0	Daily	90 days
Total Investments at Net Asset Value	**$340,924,582**	**$ 0**		

Hedge Funds

Global Asset Allocation: Consisting of one fund, this strategy is highly diversified and uses fundamental research to develop systematic rules for trading positions. Due to contractual lock-up restrictions, the value of this fund is eligible for redemption in the next 35 days.

Hedge Funds in Liquidation: MPERS currently has a small investment in three hedge funds that are in liquidation. These funds have closed and MPERS is awaiting the sale of final assets.

Multi-Strategy: Consisting of one fund, this group aims to pursue varying strategies in order to diversify risks and reduce volatility. Due to contractual lock-up restrictions, the value of this fund is eligible for redemption in the next six months.

Opportunistic Debt: Consisting of one fund, this group uses public, but illiquid, fixed income structuring to achieve higher returns by separating and securitizing the unique credit risk tranches.

Structured Credit – Relative Value: MPERS currently has one fund that is in liquidation in this strategy.

Private Real Estate Funds

MPERS invests in four core private real estate funds that are commingled in nature. Three are eligible for redemption on a quarterly basis and one on a daily basis.

Note 3 (g) – Investment Interest Rate Risk

The following table summarizes the maturities of government obligations, corporate bonds, convertible corporate bonds, mortgages, and asset-backed securities which are exposed to interest rate risk.

Summary of Weighted Average Maturities as of June 30, 2023

		Investment Maturities (in years)			
Investment Type	**Fair Value**	**Less than 1**	**1 – 5**	**6 – 10**	**More than 10**
Asset-Backed Securities	$ 560,350,966	$ 2,007,010	$ 48,042,848	$126,493,143	$383,807,965
Commercial Mortgage-Backed Securities	239,113,392	0	0	10,975,245	228,138,147
Corporate Bonds	6,513,542	98,182	3,623,896	184,721	2,606,743
Government Agencies	47,094,267	0	0	2,624,733	44,469,534
Government Bonds	24,860,547	0	1,286,016	0	23,574,531
Government Mortgage-Backed Securities	40,999,606	0	42,968	156,303	40,800,335
Government-Issued Commercial Mortgage-Backed Securities	6,278,704	0	0	0	6,278,704
Index Linked Government Bonds	22,034,754	0	10,323,307	0	11,711,447
Municipal/Provincial Bonds	136,437,093	2,131,820	12,180,308	21,874,191	100,250,774
Non-Government-Backed C.M.O.'s	10,567,465	0	495,696	0	10,071,769
Total	**$1,094,250,336**	**$ 4,237,012**	**$ 75,995,039**	**$162,308,336**	**$851,709,949**

NOTE 3 (h) – Investment Credit Ratings
The table below summarizes the credit ratings of the government obligations, corporate bonds, mortgages, and asset-backed securities.

Summary of Investment Credit Ratings as of June 30, 2023

Investment Type	AAA	AA	A	BBB	CCC
Asset-Backed Securities	$ 176,601,601	$ 80,185,389	$ 12,217,953	$ 0	$ 701,887
Commercial Mortgage-Backed Securities	28,200,325	1,323,643	0	0	0
Corporate Bonds	0	2,606,743	2,499,774	1,407,025	0
Government Agencies	0	43,263,372	0	0	0
Government Bonds	0	0	0	0	0
Government Mortgage-Backed Securities	0	0	0	0	0
Government-Issued Commercial Mortgage-Backed Securities	0	0	0	0	0
Index Linked Government Bonds	0	0	0	0	0
Municipal/Provincial Bonds	26,553,830	69,842,446	0	0	0
Non-Government-Backed C.M.O.’s	1,637,181	0	0	105,625	1,670,541
Total	**$ 232,992,937**	**$ 197,221,593**	**$ 14,717,727**	**$ 1,512,650**	**$ 2,372,428**

Continued on next page.

NOTE 3 (h) – Investment Credit Ratings

The table below summarizes the credit ratings of the government obligations, corporate bonds, mortgages, and asset-backed securities.

Summary of Investment Credit Ratings as of June 30, 2023 (continued)

Investment Type	CC	D	Not Rated	US Government Guaranteed	Total
Asset-Backed Securities	$ 33,857,462	$ 607,466	$ 256,179,208	$ 0	$ 560,350,966
Commercial Mortgage-Backed Securities	0	0	209,587,427	1,997	239,113,392
Corporate Bonds	0	0	0	0	6,513,542
Government Agencies	0	0	0	3,830,895	47,094,267
Government Bonds	0	0	4,316,719	20,543,828	24,860,547
Government Mortgage-Backed Securities	0	0	35,526	40,964,080	40,999,606
Government-Issued Commercial Mortgage-Backed Securities	0	0	0	6,278,704	6,278,704
Index Linked Government Bonds	0	0	8,587,992	13,446,762	22,034,754
Municipal/Provincial Bonds	0	0	40,040,817	0	136,437,093
Non-Government-Backed C.M.O.'s	0	0	7,154,118	0	10,567,465
Total	**$ 33,857,462**	**$ 607,466**	**$ 525,901,807**	**$ 85,066,266**	**$1,094,250,336**

Note 3 (i) – Investment Foreign Currency Risk

Currency risk is the risk that changes to foreign exchange rates will adversely impact the fair value of non-U.S. Dollar denominated assets. The following table summarizes MPERS' exposure to foreign currencies for all assets that are held in custody at the System's custodial bank. MPERS has exposure to foreign currencies in other areas of the portfolio, such as commingled international funds, hedge funds and private partnerships, which are held in the custody of other banks acting as administrators for the funds.

Exposure to Foreign Currency Risk as of June 30, 2023

Foreign Currency	Equities	Fixed Income	Real Estate / Partnerships	Cash and Cash Equivalents	Total
Australian Dollar	$ 353,063	$ 0	$ 0	$ 0	$ 353,063
British Pound Sterling	419,745	781,851	2	25,112	1,226,710
Canadian Dollar	154,648	0	3,927,566	27,984	4,110,198
Euro	688,890	500,729	41,307,790	920	42,498,329
Hong Kong Dollar	377,484	0	0	0	377,484
Hungarian Forint	0	0	0	985	985
New Israeli Shekel	0	0	0	265	265
Japanese Yen	805,177	0	0	0	805,177
Singapore Dollar	240,196	0	0	0	240,196
Swiss Franc	102,731	0	0	0	102,731
Total Exposure Risk	**$ 3,141,934**	**$ 1,282,580**	**$45,235,358**	**$ 55,266**	**$49,715,138**

Note 3 (j) – Securities Lending

In accordance with the Board of Trustees' investment policy, MPERS participates in a securities lending program. The Northern Trust Company administers the program. There are no restrictions on the amount of securities that may be lent.

Securities that may be loaned include U.S. government and agency securities, corporate equity, and fixed income securities. Collateral may include cash, U.S. government securities and irrevocable letters of credit. U.S. securities are loaned in exchange for collateral valued at 102% of the fair value of the securities, plus any accrued interest. Non-U.S. securities are loaned in exchange for collateral valued at 105% of the fair value of the securities, plus any accrued interest. On June 30, 2023, MPERS had no credit risk exposure to borrowers since the amount of collateral exceeded the amount of the loans.

Non-cash collateral cannot be pledged or sold unless the borrower defaults. The average term of the System's loans was approximately 93 days as of June 30, 2023. Cash open collateral is invested in a short-term investment pool, which had an interest sensitivity of 13 days as of June 30, 2023. Cash collateral may also be invested separately in "term loans", in which case the investments match the loan term. These loans can be terminated on demand by either lender or borrower. There were no known violations of legal or contractual provisions, or borrower or lending agent default losses. There were no dividends or coupon payments owing on the securities lent. Securities lending earnings are credited on approximately the fifteenth day of the following month.

Indemnification deals with a situation in which a client's securities would not be returned due to the insolvency of a borrower and Northern Trust would fail to live up to its contractual responsibilities relating to the lending of those securities. Northern Trust's responsibilities include performing appropriate borrower and collateral investment credit analyses and demanding adequate types and levels of collateral.

The following table summarizes the collateral held (including both cash collateral recognized in the Statement of Fiduciary Net Position and non-cash collateral).

Collateral Held as of June 30, 2023

Investment Type	Carrying Amount of Cash Collateral	Fair Value of Non-Cash Collateral
Equities	$16,033,019	$30,735,964
Corporate Fixed	1,036,654	0
Government & Government-Sponsored Securities	2,214,375	1,062,161
Total	**$19,284,048**	**$31,798,125**

Note 3 (k) – Derivatives

A derivative financial instrument is an investment whose value depends on the values of one or more underlying assets, financial indexes, or commodity prices. These investments include futures contracts, options contracts, and forward foreign currency exchange. Derivative financial instruments involve credit risk and market risk, as described in Note 3(a), in varying levels.

Through MPERS' external managers, MPERS holds investments in futures contracts, swaps contracts, options contracts, and forward foreign currency exchange contracts. MPERS enters into futures and swaps contracts to gain exposure to certain markets and enters into forward foreign exchange contracts primarily to hedge foreign currency exposure.

The notional value related to these derivative instruments is generally not recorded in the financial statements; however, the fair value for the various contracts in MPERS' portfolio as of June 30, 2023, is recorded in investments on the Statement of Fiduciary Net Position. The total changes in fair value for the year are recorded in investment income on the Statement of Changes in Fiduciary Net Position.

Investment Derivatives as of June 30, 2023

Type	Classification	Notional Value	Unrealized Gain / (Loss)
Futures Contracts	Investments, at fair value	$ 691,482,153	$ 82,915,671
Swaps Contracts	Investments, at fair value	431,040,373	26,343,515
Total		**$1,122,522,526**	**$109,259,186**

Through the use of derivatives, MPERS is exposed to risk that the counterparties involved in the contracts are unable to meet the terms of their obligation. MPERS' investment managers seek to control this risk through counterparty credit evaluations and approvals, counterparty credit limits, and exposure monitoring procedures. MPERS anticipates the counterparties will be able to satisfy their obligations under contract.

At June 30, 2023, the counterparties' credit ratings for swaps are subject to credit risk as shown in the table below. Derivative instruments traded on the exchange are not subject to counterparty risk and therefore are not included in the table below.

Counterparty Credit Ratings as of June 30, 2023

Quality Rating	Swaps
A+	$362,707,085
A-	68,333,288
Total Subject to Credit Risk	**$431,040,373**

NOTE 4 – RECEIVABLES

Receivables as of June 30, 2023

Type	Total
Contributions – MoDOT	$ 6,480,441
Contributions – MSHP Non-Uniformed	1,471,542
Contributions – MSHP Uniformed	2,319,419
Contributions – MPERS	275,886
Investment Interest & Income	13,449,780
Investment Sales	19,229,893
Miscellaneous	3,000
Total	**$43,229,961**

NOTE 5 – CONTRIBUTIONS

MoDOT, MSHP, and MPERS make contributions to the System, as do employees covered under the Year 2000 Plan-2011 Tier. MPERS' permanent funding policy provides for actuarially determined employer contributions using the entry-age actuarial cost method. As of June 30, 2023, the funding policy has a 1-year closed amortization period for unfunded retiree liabilities and a 16-year closed amortization period for other unfunded liabilities. Actuarially determined rates, expressed as percentages of annual covered payroll, provide for amounts sufficient to fund those benefits designated by state statute to be funded in advance. Actuarial assumptions used to compute contribution requirements are the same as those used to compute the pension benefit obligation. The employee contribution rate for members of the Year 2000 Plan-2011 Tier is set by statute.

Required employer contributions totaling $232,813,995 for fiscal year 2023, represent funding of normal costs and amortization of the unfunded accrued liability. Actual contributions made were 100% of required contributions. Contribution rates for the fiscal year ended June 30, 2023, as determined by the actuarial valuation for the year ended June 30, 2021, are shown in the following table. The Board established actual rates to be the same as the actuarially determined rates.

Contribution Rates

MoDOT, MPERS & Civilian Patrol	Uniformed Patrol	2011 Tier Employee
58.00%	58.65%	4.00%

In September 2014, the Board adopted a contribution stabilization reserve fund from experience gains in an effort to keep contribution rates relatively level over time. In February 2015, the Board established a maximum of $250 million in the contribution stabilization reserve fund. The balance of the reserve as of June 30, 2023 was $250,000,000.

NOTE 6 – DEFERRED RETIREMENT OPTION PROGRAM

MPERS currently provides a BackDROP option. This is an election made at the time of actual retirement. In effect, it provides members an option to elect to receive a portion of their benefits as cash. Since the election is not made until the member actually retires, the option is not treated as a DROP provision in accordance with generally accepted accounting principles.

NOTE 7 – NET PENSION LIABILITY OF EMPLOYERS

The components of the net pension liability of the employers as of June 30, 2023, were as follows:

Total pension liability	$ 4,709,391,407
Plan fiduciary net position	(3,281,627,844)
Employers' net pension liability	$ 1,427,763,563
Plan fiduciary net position as a percentage of the total pension liability	69.68%
Covered payroll	$ 400,799,485
Employers' net pension liability as a percentage of covered payroll	356.23%

Actuarial Assumptions

The total pension liability amounts were determined by actuarial valuations as of June 30, 2023, using the following actuarial assumptions, applied to all prior periods included in the measurement:

Inflation (price inflation)	2.25%
Salary Increases (includes 3.00% wage inflation)	3.00% to 10.50%
Investment Rate of Return	6.50%

Post-retirement healthy mortality rates are used to measure the probabilities of members dying after retirement. The rates currently in use are from the Pub-2010 General, Healthy Retiree, Amount-Weighted, Below-Median Income tables for males and females for Non-Uniformed members and Pub-2010 Public Safety Healthy Retiree, Amount-Weighted, tables for males and females for Uniformed members. Rates are decreased by 5% for non-uniform males and increased by 4% for uniform males. The assumed rates are adjusted for mortality improvement back to the observation period base year of 2010 and then projected generationally from 2010 to 2019 using scale MP-2021 and 90% of scale MP-2021 for years following 2019.

Pre-retirement mortality rates currently in use for active lives are the Pub-2010 General, Employee, Amount-Weighted, Below-Median Income tables for males and females for Non-Uniformed members and the Pub-2010 Public Safety Employee, Amount-Weighted, tables for males and females for Uniformed members. The assumed rates are adjusted for mortality improvement back to the observation period base year of 2010 and then projected generationally from 2010 to 2019 using scale MP-2021 and 90% of scale MP-2021 for years following 2019.

Post-Retirement Disabled mortality rates currently in use for disabled lives are the Pub-2010 General Disabled Retiree, Amount-Weighted tables for males and females for Non-Uniformed members and the Pub-2010 Public Safety Disabled Retiree, Amount-Weighted tables for males and females for Uniformed members. The assumed rates are adjusted for mortality improvement back to the observation period base year of 2010 and then projected generationally from 2010 to 2019 using scale MP-2021 and 90% of scale MP-2021 for years following 2019.

The long-term (30 year) expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return were adopted by the plan's trustees after considering input from the plan's investment consultants and actuary. These estimates for each major asset class included in MPERS' target asset allocation as of June 30, 2023, (see Note 3) are summarized in the following table:

Asset Class	Long-Term Expected Rate of Return
Global Equity	3.0%
Private Equity	6.4%
Fixed Income	2.0%
Opportunistic Debt	5.9%
Real Assets	3.6%
Real Estate	2.6%

Discount Rate

A single discount rate of 6.50% was used to measure the total pension liability. This single discount rate was based on the expected rate of return on pension plan investments of 6.50%. The projection of cash flows used to determine this single discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Regarding the sensitivity of the net pension liability to changes in the single discount rate, the following presents the plan's June 30, 2023 net pension liability, calculated using a single discount rate of 6.50%, as well as what the plan's net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower or 1-percentage-point higher:

		Current Single Discount	
	1% Decrease	**Rate Assumption**	**1% Increase**
	5.50%	**6.50%**	**7.50%**
Net Pension Liability	$2,009,047,608	$1,427,763,563	$947,694,408

NOTE 8 – EMPLOYER PROPORTIONATE SHARE

MPERS, as the administrative agent for the pension system, is also an employer of the pension system. The administrative expenses of the pension system are included in the deductions to the pension system's fiduciary net position. While the employer contributions of the other participating employers are funded from outside revenue sources, the employer contributions of MPERS are funded from sources already recognized as revenues, such as earnings on plan investments or contributions paid by the other participating employers. Attempting to allocate a portion of the net pension liability to MPERS as an employer would result in an allocation of the net pension liability to the other participating employers. Accordingly, MPERS excludes its contributions from the employer proportionate share calculation for the reporting of a net pension liability, by assigning itself a proportionate share of 0%. This exclusion, in essence, shifts the portion of the net pension liability that would accrue to MPERS to the other participating employers.

NOTE 9 – PERSONNEL SERVICES AND RETIREMENT PLAN

MPERS employed 19 full-time employees as of June 30, 2023. Twelve former MPERS employees have retired.

Full-time employees are members of the System (see Note 8). For these employees, MPERS accrued 58.00% of payroll during fiscal year 2023, amounting to $1,506,656. The amounts for fiscal year 2023 and the four preceding years are shown below. These amounts are recorded as both a contribution and administrative expense. Information regarding the retirement plans can be found in Notes 2 and 5.

Net Obligations

Year Ended	**Annual Contribution Accrual**	
June 30	**Percent**	**Dollars**
2019	58.00%	$ 987,370
2020	58.00	987,743
2021	58.00	1,219,468
2022	58.00	1,374,954
2023	58.00	1,506,656

NOTE 10 – OTHER POST-EMPLOYMENT BENEFITS (OPEB)

In addition to the retirement benefits described previously, MPERS provides a portion of health care insurance through the MoDOT and MSHP Medical and Life Insurance Plan (Insurance Plan) in accordance with Missouri State statutes. The Insurance Plan is considered an agent multiple employer defined benefit plan and is administered by MoDOT. The Insurance Plan is financed on a pay-as-you-go basis and is an internal service fund of MoDOT. As of June 30, 2023, there were 9 inactive (retired) members and 19 active employees participating in the Insurance Plan.

Medical insurance benefits are established by the Insurance Plan's Board of Trustees and are approved by the Missouri Highways and Transportation Commission. Benefits include general inpatient and outpatient medical services; mental, nervous and substance abuse care; and prescriptions. Eligible members are employees who retired from the System with a minimum of 5 years of service and who participate in the Insurance Plan. MoDOT issues a publicly available financial report that includes financial statements and required supplementary information for the Insurance Plan. Requests for this report should be addressed to MoDOT, Financial Services Division, P.O. Box 270, Jefferson City, MO 65102.

Employer and member contributions are established by the Insurance Plan's Board of Trustees and are approved by the Missouri Highways and Transportation Commission. Premiums vary by coverage categories, which include retirees, certain disabled employees, spouses, certain dependents, and survivors of deceased employees and retirees.

Changes in Total OPEB Liability

MPERS' proportionate share (0.17%) of the Insurance Plan's net OPEB liability is $1,929,126 which was measured as of July 1, 2022, and the total OPEB liability used to calculate the net OPEB liability was determined by an actuarial valuation as of that date**.**

Summary of Changes in Net OPEB Liability for the Year Ended June 30, 2023

	Total
Beginning Balance	$2,367,620
Changes for the year:	
Service Cost	81,825
Interest Cost	52,551
Changes of benefit terms	0
Differences between expected and actual experience	(8,837)
Changes in assumptions	(530,806)
Benefit Payments	(33,227)
Net Changes	(438,494)
Ending Balance	**$1,929,126**

Deferred Outflows and Inflows

For the year ended June 30, 2023, MPERS recognized net OPEB expense of $84,703 MPERS reported deferred outflows of resources and deferred inflows of resources related to OPEB from the following sources:

Deferred Outflows of Resources and Deferred Inflows of Resources Related to OPEB

	Deferred Outflows	**Deferred Inflows**
Differences between expected and actual experience	$174,233	$ 15,758
Changes of assumptions or other inputs	200,355	480,965
Contributions subsequent to measurement date	23,667	0
Total	**$398,255**	**$496,723**

Deferred outflows resulting from contributions subsequent to the measurement date will be recognized as a change to the net pension liability in each subsequent year. Other deferred amounts related to OPEB will be recognized in expenses as follows:

Deferred Outflows of Resources and Deferred Inflows of Resources Related to OPEB

Fiscal Year	
2024	$ 8,235
2025	2,416
2026	15,260
2027	(44,396)
2028	(79,983)
Total Thereafter	0
	$ (98,468)

Actuarial Assumptions

The following actuarial assumptions and other inputs, applied to all periods included in the measurement:

Cost method	Entry Age Normal based upon salary
Salary increases	2.50%
Discount rate	3.54%
Investment rate of return	N/A; the plan is unfunded
Health care cost trend rates	5.60%; decreasing to 4.65% in 2027
Retirees' share of benefit-related costs	43.03% - 90%
Admin Expense Trend (Inflation) Rate	3.00%

- The salary increases were based on projected salaries, which include COLAs, provided by MoDOT.
- The discount rate was based on Bond Buyer General Obligation 20-Bond Municipal Bond Index.
- Mortality rates were based on Pub-2010 Public Retirement Plans Safety Employees Mortality Table weighted by Headcount projected by MP-2021.
- The actuarial assumptions used in the June 30, 2023 valuation were based on the results of an actuarial experience study for the period July 1, 2021-June 30, 2022.
- It is assumed the current employer and member contributions will continue as approved by the Commission.

Changes of assumptions and other inputs reflect a change in the discount rate from 2.16% in 2022 to 3.54% in 2023.

The following table illustrates the impact of interest rate sensitivity on the Net OPEB Liability as of June 30, 2023:

Interest Rate Sensitivity

	1% Decrease	**Current Discount Rate**	**1% Increase**
Net OPEB Liability	$2,295,240	$1,929,126	$1,640,778

The following table illustrates the impact of healthcare cost trend sensitivity on the Net OPEB Liability as of June 30, 2023:

Healthcare Cost Trend Sensitivity

	1% Decrease	**Current Discount Rate**	**1% Increase**
Net OPEB Liability	$1,594,821	$1,929,126	$2,361,447

NOTE 11 – CAPITAL ASSETS

Summary of Changes in Capital Assets

	June 30, 2022 Balance	Additions	Deletions / Retirements	June 30, 2023 Balance
Land	$ 188,319	$ 0	$ 0	$ 188,319
Building	581,619	164,209	0	745,828
Furniture, Equipment and Software	3,438,789	7,065	0	3,445,854
Less: Accumulated Depreciation	(3,819,812)	(23,751)	0	(3,843,563)
Total	**$ 388,915**	**$ 147,523**	**$ 0**	**$ 536,438**

NOTE 12 – COMMITMENTS

In December 2022, MPERS entered into a revolving credit agreement with Bank of America, N.A. consisting of a line of credit not to exceed $200 million. Under the terms of the credit agreement, each revolving loan shall bear interest on the outstanding principal amount thereof at a rate per annum equal to the Base Rate (fluctuating rate of interest per annum equal to the highest of (a) the Federal Funds Rate plus 0.50%, (b) the rate of interest in effect for such day as publicly announced from time to time by Bank of America as its “prime rate,” and (c) the Daily SOFR Rate plus 1.00%) plus the applicable spread (a rate per annum equal to (a) in the case of Base Rate Loans, 0.00% and (b) in the case of Daily SOFR Rate Loans, 1.20%). MPERS leverage ratio at June 30, 2023, was approximately 10.6. The bank line of credit at June 30, 2023 consisted of a revolving loan of $130.1 million, that was paid off July 12, 2023. The credit agreement contains covenants customary for financings of this type, including, but not limited to, financial covenants, which requires that MPERS Fair Value-Total Fund Investment Assets shall not be less than $1.5 billion at any time and MPERS Funded Ratio shall not be less than 50% at any time. MPERS was in compliance with these financial covenants at June 30, 2023.

NOTE 13 – COMMITMENTS

MPERS has committed $1,845,881,622 of which $1,239,424,870 has been invested, leaving total unfunded commitments to private equity, real estate, real assets, and opportunistic debt of $606,456,752 as of June 30, 2023. The total unfunded investment commitments are not recorded in the accompanying Statement of Fiduciary Net Position.

NOTE 14 – RISK MANAGEMENT

MPERS is exposed to various risks of loss related to natural disasters, asset theft or damage, errors and omissions, torts, and employee injuries.

MPERS has purchased commercial insurance related to capital asset loss and damage. Ancillary coverage provided through the property policy includes coverage for accounts receivable, loss of money and securities, employee dishonesty, and forgery and alterations. MPERS carries a $2 million umbrella liability policy. MPERS has coverage through Missouri Highway and Transportation Commission’s Self-Insurance Fund related to workers’ compensation. MPERS has also purchased a directors and officers liability policy with $1 million aggregate coverage. This coverage is inclusive of legal defense costs and carries a $35,000 deductible. The State’s Legal Expense Fund covers all state employees and officers, and MPERS has purchased surety bonds for the executive director and staff. Settlements have not exceeded coverages for each of the past three fiscal years.

MPERS has a disaster recovery plan that provides for continued computer operations at a remote location should the retirement office be unavailable for normal computing operations.

Schedule of Changes in the Employers' Net Pension Liability
Year Ended June 30

	2023	2022	2021	2020	2019
Total Pension Liability					
Service Cost (1)	$ 52,759,573	$ 55,097,433	$ 43,726,886	$ 44,048,083	$ 43,971,030
Interest on the Total Pension Liability	279,014,877	275,067,181	278,522,994	274,791,358	271,174,089
Benefit Changes	0	0	0	0	0
Difference Between Expected and Actual Experience	211,609,428	16,085,222	(26,471,689)	3,494,582	203,459
Assumption Change	44,379,018	0	226,319,675	0	0
Benefit Payments (2)	(288,084,295)	(278,612,715)	(266,108,191)	(262,710,811)	(255,310,406)
Refunds	(972,241)	(1,024,986)	(611,132)	(796,107)	(780,538)
Disability Premiums (2)	0	0	(1,600,628)	(1,640,971)	(1,615,860)
Transfers to Other Retirement Systems (2)	0	0	(1,802,900)	(2,457,945)	(2,111,007)
Net Change in Total Pension Liability	**298,706,360**	**66,612,135**	**251,975,015**	**54,728,189**	**55,530,767**
Total Pension Liability – Beginning	**4,410,685,047**	**4,344,072,912**	**4,092,097,897**	**4,037,369,708**	**3,981,838,941**
Total Pension Liability – Ending (a)	**$4,709,391,407**	**$4,410,685,047**	**$4,344,072,912**	**$4,092,097,897**	**$4,037,369,708**
Plan Fiduciary Net Position					
Contributions – Employer	$ 232,813,995	$ 212,711,117	$ 208,212,848	$ 210,871,852	$ 210,166,927
Contributions – Employee (3)	11,448,174	12,655,780	7,095,963	6,547,351	5,996,344
Pension Plan Net Investment Income	264,758,383	122,767,680	699,644,536	(10,667,857)	154,326,818
Benefit Payments (2)	(288,084,295)	(278,612,715)	(266,108,191)	(262,710,811)	(255,310,406)
Refunds	(972,241)	(1,024,986)	(611,132)	(796,107)	(780,538)
Disability Premiums (2)	0	0	(1,600,628)	(1,640,971)	(1,615,860)
Pension Plan Administrative Expense	(5,529,258)	(5,229,018)	(4,585,473)	(4,291,028)	(4,372,966)
Net Transfers (1) (2)	0	0	277,417	1,025,629	321,363
Net Change in Plan Fiduciary Net Position	**214,434,758**	**63,267,858**	**642,325,340**	**(61,661,942)**	**108,731,682**
Plan Fiduciary Net Position – Beginning	**3,067,193,086**	**3,003,925,228**	**2,361,599,888**	**2,423,261,830**	**2,314,530,148**
Plan Fiduciary Net Position – Ending (b)	**$3,281,627,844**	**$3,067,193,086**	**$3,003,925,228**	**$2,361,599,888**	**$2,423,261,830**
Adjustment – GASB 75 Implementation					
Plan Fiduciary Net Position – Ending (as restated)					
Employers' Net Pension Liability (a) – (b)	**$1,427,763,563**	**$1,343,491,961**	**$1,340,147,684**	**$1,730,498,009**	**$1,614,107,878**
Plan Fiduciary Net Position as a % of Total Pension Liability	69.68%	69.54%	69.15%	57.71%	60.02%
Covered Payroll	$ 400,799,485	$ 367,493,332	$ 359,409,940	$ 363,980,262	$ 362,747,630
Employers' Net Pension Liability as a % of Covered Payroll	356.23%	365.58%	372.87%	475.44%	444.97%

Continued on next page.

(1) Starting fiscal year 2022, Service Cost includes disability expense, service purchases, and transfers from other systems.
(2) Starting fiscal year 2022, Benefit Payments includes disability premiums and transfers to other systems.
(3) Starting fiscal year 2022, Contributions – Employee includes service purchases and transfers from other systems.

Schedule of Changes in the Employers' Net Pension Liability
Year Ended June 30 (continued)

	2018	2017	2016	2015	2014
Total Pension Liability					
Service Cost	$ 46,621,377	$ 45,713,403	$ 45,441,305	$ 45,358,095	$ 44,739,603
Interest on the Total Pension Liability	286,457,436	283,568,441	280,432,068	275,284,910	270,525,608
Benefit Changes	(7,684)	0	0	0	0
Difference Between Expected and Actual Experience	(37,173,164)	(37,286,966)	(39,810,009)	(13,324,219)	(17,614,321)
Assumption Change	142,556,109	0	0	0	0
Benefit Payments	(254,131,209)	(246,617,775)	(236,488,629)	(236,905,323)	(227,958,108)
Refunds	(503,007)	(321,328)	(198,106)	(107,395)	(18,686)
Disability Premiums	(1,601,605)	(1,620,418)	(1,567,825)	(1,554,676)	(1,531,578)
Transfers to Other Retirement Systems	(2,823,042)	(2,724,631)	(1,921,451)	(3,147,482)	(1,876,336)
Net Change in Total Pension Liability	**179,395,211**	**40,710,726**	**45,887,353**	**65,603,910**	**66,266,182**
Total Pension Liability – Beginning	**3,802,443,730**	**3,761,733,004**	**3,715,845,651**	**3,650,241,741**	**3,583,975,559**
Total Pension Liability – Ending (a)	**$3,981,838,941**	**$3,802,443,730**	**$3,761,733,004**	**$3,715,845,651**	**$3,650,241,741**
Plan Fiduciary Net Position					
Contributions – Employer	$ 204,955,180	$ 206,562,924	$ 199,609,396	$ 200,638,571	$ 183,353,841
Contributions – Employee	5,001,418	4,891,932	3,482,513	3,294,162	2,260,563
Pension Plan Net Investment Income	197,619,838	220,301,741	21,432,095	92,645,571	319,445,780
Benefit Payments	(254,131,209)	(246,617,775)	(236,488,629)	(236,905,323)	(227,958,108)
Refunds	(503,007)	(321,328)	(198,106)	(107,395)	(18,686)
Disability Premiums	(1,601,605)	(1,620,418)	(1,567,825)	(1,554,676)	(1,531,578)
Pension Plan Administrative Expense	(4,693,492)	(4,515,458)	(4,370,860)	(4,066,944)	(3,736,355)
Net Transfers	(955,597)	(980,524)	808,228	(2,033,045)	(91,954)
Net Change in Plan Fiduciary Net Position	**145,691,526**	**177,701,094**	**(17,293,188)**	**51,910,921**	**271,723,503**
Plan Fiduciary Net Position – Beginning	**2,168,838,622**	**1,992,073,946**	**2,009,367,134**	**1,957,456,213**	**1,685,732,710**
Plan Fiduciary Net Position – Ending (b)	**$2,314,530,148**	**$2,169,775,040**	**$1,992,073,946**	**$2,009,367,134**	**$1,957,456,213**
Adjustment – GASB 75 Implementation		**(936,418)**			
Plan Fiduciary Net Position – Ending (as restated)		**$2,168,838,622**			
Employers' Net Pension Liability (a) – (b)	**$1,667,308,793**	**$1,633,605,108**	**$1,769,659,058**	**$1,706,478,517**	**$1,692,785,528**
Plan Fiduciary Net Position as a % of Total Pension Liability	58.13%	57.06%	52.96%	54.08%	53.63%
Covered Payroll	$ 353,751,292	$ 356,515,416	$ 344,635,441	$ 342,264,593	$ 336,590,797
Employers' Net Pension Liability as a % of Covered Payroll	471.32%	457.95%	513.49%	498.58%	502.92%

Schedule of Employers' Contributions
Last 10 Fiscal Years

	Actuarially Determined Contributions	Actual Contributions	Contribution Deficiency (Excess)	Covered Payroll*	Contributions as a Percentage of Covered Payroll
2014	$183,353,841	$183,353,841	$0	$336,799,855	54.44%
2015	200,638,571	200,638,571	0	342,211,446	58.63
2016	199,609,396	199,609,396	0	344,154,131	58.00
2017	206,562,924	206,562,924	0	356,142,972	58.00
2018	204,955,180	204,955,180	0	353,371,000	58.00
2019	210,166,927	210,166,927	0	362,356,771	58.00
2020	210,871,852	210,871,852	0	363,572,159	58.00
2021	208,212,848	208,212,848	0	358,987,669	58.00
2022	212,711,117	212,711,117	0	366,743,305	58.00
2023	232,813,995	232,813,995	0	400,285,401	58.16

**Values are estimated from contribution rate and actual contribution amount.*

Schedule of Investment Returns
Last 10 Fiscal Years

Fiscal Year Ended June 30	Annual Money-Weighted Rate of Return
2014	17.58%
2015	6.62
2016	1.02
2017	11.22
2018	9.20
2019	6.84
2020	(0.44)
2021	30.79
2022	4.00
2023	8.87

Notes to Required Supplementary Information

The information presented in the required supplementary schedules was determined as part of the actuarial valuation at the dates indicated. Additional information as of the latest actuarial valuation follows:

Valuation Date .... June 30, 2023
Actuarial Cost Method .... Entry Age
Amortized Method .... Closed, Level Percent of Payroll
Remaining Amortization Period .... 16 Years
Asset Valuation Method .... 3-Year Smoothed Fair Value: 20% Corridor
Inflation .... 2.25% (price inflation)
Actuarial Assumptions:
Investment Rate of Return 6.50%
Projected Salary Increase .... 3.00% to 10.50% (includes 3.00% wage inflation)
Cost-of-Living Adjustments .... 1.80% Compound

Other Post-Employment Benefits (OPEB) Plan
Schedule of Changes in Net OPEB Liability and Related Ratios for
MoDOT and MSHP Medical and Life Insurance Plan

	2023	2022	2021	2020	2019	2018
Total OPEB Liability						
Service Cost	$ 81,825	$ 74,581	$ 51,302	$ 64,136	$ 66,676	$ 81,000
Interest Cost	52,551	45,896	55,700	61,346	54,714	49,929
Changes of Benefit Terms	0	0	0	0	0	0
Differences Between Expected and Actual Experience	(8,837)	263,007	452	(17,475)	(12,565)	0
Changes in Assumptions	(530,806)	(368)	393,621	(58,897)	(81,559)	(238,129)
Benefit Payments	(33,227)	(35,099)	(33,865)	(35,159)	(34,004)	(37,055)
Net Change in Total OPEB Liability	(438,494)	348,017	467,210	13,951	(6,738)	(144,255)
Total OPEB Liability (Beginning)	**2,367,620**	**2,019,603**	**1,552,393**	**1,538,442**	**1,545,180**	**1,689,435**
Total OPEB Liability (Ending)	**$1,929,126**	**$2,367,620**	**$2,019,603**	**$1,552,393**	**$1,538,442**	**$1,545,180**
Plan Fiduciary Net Position						
Contributions	$ 33,227	$ 35,099	$ 33,865	$ 35,159	$ 34,004	$ 37,055
Benefit Payments	(33,227)	(35,099)	(33,865)	(35,159)	(34,004)	(37,055)
Net Change in Plan Fiduciary Net Position	**0**	**0**	**0**	**0**	**0**	**0**
Plan Fiduciary Net Position (Beginning)	**0**	**0**	**0**	**0**	**0**	**0**
Plan Fiduciary Net Position (Ending)	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**
Net OPEB Liability (Ending)	$1,929,126	$2,367,620	$2,019,603	$1,552,393	$1,538,442	$1,545,180
Net Position as a Percentage of OPEB Liability	N/A	N/A	N/A	N/A	N/A	N/A
Covered-Employee Payroll	$2,016,099	$1,889,323	$1,791,020	$1,760,722	$1,639,523	$ 790,000
Net OPEB Liability as a Percentage of Payroll	95.69%	125.32%	112.76%	88.17%	93.83%	195.59%

Notes:

The Insurance Plan is financed on a pay-as-you-go basis and is an internal service fund of MoDOT.

These schedules are intended to present information for 10 years but may be built prospectively. Additional years will be displayed as they become available.

Other Post-Employment Benefits (OPEB) Plan
Schedule of MPERS' Proportionate Share of Net OPEB Liability
for MoDOT and MSHP Medical and Life Insurance Plan

Year Ended June 30	Proportion of Net OPEB Liability	Proportionate Share of Net OPEB Liability	Covered Employee Payroll	Net OPEB Liability as % of Covered Employee Payroll	Net Position as % of Total OPEB Liability
2018	0.14%	$1,545,180	$ 790,000	195.59%	N/A
2019	0.14%	1,538,442	1,639,523	93.83%	N/A
2020	0.15%	1,552,393	1,760,722	88.17%	N/A
2021	0.15%	2,019,603	1,791,020	112.76%	N/A
2022	0.17%	2,367,620	1,889,323	125.32%	N/A
2023	0.17%	1,929,126	2,016,099	95.69%	N/A

Notes:

The Insurance Plan is financed on a pay-as-you-go basis and is an internal service fund of MoDOT.

These schedules are intended to present information for 10 years but may be built prospectively. Additional years will be displayed as they become available.

Schedule of Administrative Expenses
For the Year Ended June 30, 2023

Personnel Services	
Salary Expense	$ 2,619,824
Employee Benefit Expense	1,968,827
Total Personnel Services	**4,588,651**
Professional Services	
Actuarial Services	110,590
Audit Services	51,000
Legislative Consultant	31,200
Investment Special Consulting	25,000
Insurance Consultant	7,800
Other Consultant Fees	37,698
Fiduciary Insurance	25,233
IT Hosting and Support	297,385
Other	24,237
Total Professional Services	**610,143**
Miscellaneous	
Depreciation	23,751
Meetings / Travel / Education	74,526
Equipment / Supplies	85,081
Printing / Postage	27,394
Bank Service Charge	9,211
Building Expenses	41,513
Other	68,988
Total Miscellaneous	**330,464**
Total Administrative Expenses	**$ 5,529,258**

Schedule of Investment Expenses
For the Year Ended June 30, 2023

Investment Income Expenses	
Management and Performance Fees by Asset Class	
Equities	$ 1,497,705
Fixed Income Core	100,856
Opportunistic Debt	5,080,628
Real Estate	5,218,402
Private Equity	6,628,339
Real Assets	5,922,691
Hedge Funds	2,424,461
Total Management and Performance Fees	**$26,873,082**
Investment Custodial Fees	78,926
Performance Management	218,258
General Consultant (Monitoring) Fee	355,000
Professional Fees	465,338
Investment Interest Expense	4,705,746
Other Fees / Expenses (Refunds)	(258,014)
Total Investment Income Expenses	**$32,438,336**
Securities Lending Expenses	
Borrower Rebates (Refunds)	$ 619,996
Bank Fees	83,935
Total Securities Lending Expenses	**$ 703,931**

Schedule of Consultant and Professional Expenses
For the Year Ended June 30, 2023

Professional / Consultant	Nature of Service	
Gabriel, Roeder, Smith & Co.	Actuarial	$110,590
LexisNexis Risk Data Management	Death Audit Services	1,800
MO Department of Health & Senior Services	Death Audit Services	1,205
Pension Benefit Information	Death Audit Services	10,537
Cobalt Community Research	Customer Service	1,175
Naught-Naught Agency	Director's & Officer's Insurance	24,071
Alliant Insurance Services, Inc.	Employee Crime Bond	1,162
Williams-Keepers, LLC	Financial Audit Services	51,000
Tanner Accountants & Advisors	Cyber Security Consulting	31,800
Porter, Berendzen & Associates Architecture	Architecture Services	9,520
Midwest Computech	Information Technology	47,508
Huber & Associates	Information Technology	3,055
Levi, Ray & Shoup, Inc.	Information Technology	240,435
Sikich, LLP	Information Technology	6,387
Thompson Coburn, LLP	Legal Consulting	5,898
Michael G. Winter Consultants, LLC	Legislative Consulting	31,200
Evercore Group, LLC	Market Research	25,000
Charlesworth Benefits	Risk Management Consulting	7,800
Total Consultant and Professional Expenses		**$610,143**

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MoDOT & Patrol Employees' Retirement System (MPERS)
Financial security for past, present, and future members.

Investment Section

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September 30, 2023

To the Board of Trustees and System Members:

It is my pleasure to provide the Investment Section of this year's Annual Comprehensive Financial Report (Annual Report). This letter is an overview of investment performance during the past year and staff's expectations of the investment markets in the years to come.

The theme of this year's annual report is "Security for your Future," which ties nicely to the investment section given the relationship between investment performance and financial security. This report marks the 20th year I have written to you as MPERS' Chief Investment Officer, and I am proud to report the System has never been in a more "secure" position.

When I began my employment with MPERS in 2003, the investment portfolio was relatively straightforward, relying on the traditional stock and bond markets to deliver the targeted returns. The turn of the century brought a major downturn in the equity markets (led by overvalued internet and technology companies) and considerably lower interest rates in the bond markets. The traditional 60/40 mix of stocks and bonds was no longer expected to generate a return that met MPERS' actuarial hurdles. MPERS' Board of Trustees recognized the need to adapt and change and began a major overhaul of the investment portfolio to match the new investment climate. The most noteworthy changes included the hiring of dedicated investment staff to administer the program, surrounding that staff with highly regarded consultants, and using alternative investment strategies to boost expected returns and manage risk.

Fast forward 20 years, and you will see the efforts to restructure the investment portfolio have served the System well. Fiscal Year 2023 was another good year, as MPERS' return of 8.88% was in line with the median public fund return and easily outperformed both the policy benchmark of 6.43% (the hypothetical return earned by investing passively across the targeted asset allocation) and the actuarial hurdle of 6.5% (the assumed rate of return necessary for determining the cost of the plan). Fiscal Year 2023 also marks the first year that MPERS can add a 20-year (net-of-fees) return to its long-term reporting package and those results are even more impressive, as MPERS' investment returns rank in the top 1% of the peer universe over the past 3-, 5-, 10-, and 20-year return periods. A logical question might be "how much risk are you taking to obtain those returns?," and we are pleased to report that the numbers look equally impressive on a risk-adjusted basis. MPERS continues to maintain a lower risk profile than 99% of the peer group (with risk measured by standard deviation of returns over the past 20-year period). The combination of strong returns and low risk has produced a risk/return profile (as measured by a system's Sharpe Ratio) that also ranks in the top 1% of the peer universe over all long-term measurement periods.

While we are certainly proud of the progress MPERS has made to secure the safety of your retirement benefit, we are always mindful that historical performance is not always indicative of future success. Twenty years ago, falling interest rates and overvalued stock markets suggested investors should look elsewhere for attractive returns. As we look forward to Fiscal Year 2024 and beyond, the market environment is transforming once again. Inflationary pressures have forced the Federal Reserve to raise the overnight Fed Funds Rate to 5.5%, and long-term Treasury yields have spiked to over 5% (both of which are levels not seen since 2007). The higher interest rate environment will certainly put pressure on corporate profits and the price investors are willing to pay to own equities and other risky assets. In a classic case of "what goes around comes around," traditional fixed income once again looks like an attractive investment strategy. It very well could be the beginning of a new era where "simpler is better" and investors migrate back to traditional stocks and bonds to deliver attractive investment results.

Regardless, obstacles and uncertainty typically lead to opportunities, and MPERS' portfolio has the governance model and structure in place to capitalize on whatever the future holds. We continue to build MPERS' internal staffing capabilities and surround that staff with highly regarded investment consultants to help us successfully navigate the uncertainty in the marketplace. Unlike many of our peers, MPERS' strong investment performance and solid funding policies have led to significant improvement in the System's funded status. We are truly providing the "Security for your Future" that will benefit current and future members alike for years to come.

Thank you for the opportunity to serve as your Chief Investment Officer, and I hope you enjoy this year's annual report.

Sincerely,

Larry Krummen, CFA
Chief Investment Officer

Kevin M. Leonard
Partner

NEPC LLC
255 State Street
Boston, MA 02109

September 15, 2023

The Board of Trustees
MoDOT & Patrol Employees' Retirement System
PO Box 1930
Jefferson City, MO 65102

RE: 2023 Annual ACFR Letter

Dear Board Members:

In our role as the general investment consultant, we assist the Board in several manners: determining and executing the overall asset allocation strategy of the Plan; advising on the investment policy of the Plan; facilitating investment manager searches (both traditional and alternative asset classes); conducting custodial service searches; providing ongoing performance evaluation for each individual investment manager and the overall investment portfolio; as well as providing pertinent education to the Board.

MPERS' objective is to provide service, disability, death and vested retirement benefits to members and their beneficiaries. To ensure a solid foundation for the future of the System, MPERS has developed an investment program designed to achieve the actuarially assumed rate of return over the long term, while prudently managing the risk of the portfolio. The pension plan is required to satisfy the need to pay accumulated/earned retirement benefits today, while at the same time be prepared for "uncertain" future benefits. This balancing of short-term versus long-term needs is a key tenant in the overall construction of the portfolio. To facilitate this balance, the Board has adopted a diversified asset allocation structure. Our goal is to diversify the System's assets within the traditional and non-traditional asset classes to reduce volatility, achieve above market returns, and to better protect the portfolio against difficult market conditions.

MPERS Fiscal Year 2023 Performance and Key Initiatives

For the fiscal-year-ending June 30, 2023, the MPERS Total Plan returned +8.9% on a net-of-fees basis, outperforming the policy index return of 6.4%. For the fiscal-year-ending June 30, 2023, relative to the peer group comparison (InvMetrics Public DB Net Universe), MPERS ranked in the 55th percentile (1st percentile being the highest, 100th percentile being the lowest). For the fiscal year, total Plan outperformance (relative to policy index) was driven by relative outperformance in the public equities, private equity, traditional fixed income, real assets, and the real estate portfolios. The only portfolio to underperform its respective benchmark was the opportunistic debt portfolio with a return of 5.45% versus 9.06% for the benchmark. Although underperforming its benchmark, the opportunistic debt portfolio was the third highest absolute performing portfolio for the year with its return of 5.45%.

During Fiscal Year 2023, key initiatives accomplished included:

- Conducted a comprehensive/formal review of the Plan's asset allocation in concert with NEPC's 2023 Client Actions and Asset Class Assumptions.
  - As part of the review, NEPC and Staff evaluated the Plan's existing asset allocation and discussed any potential changes to its current structure.
    - Based on the review and discussions, no changes were recommended.

- A liquidity study was conducted as part of the asset allocation review.
  - The results of the liquidity study reaffirmed that the Plan's liquidity remains healthy enough to support the current allocation to alternative investments, but certain economic environments and developing trends may change the liquidity profile of the Plan.

- Continued to develop the alternative investment portfolio.
  - A private market pacing plan was conducted for the opportunistic debt, private equity, real assets, and real estate portfolios. Each pacing plan provided a recommended commitment amount for upcoming vintage years.
  - New commitments were made to the private equity, opportunistic debt, and real estate portfolios.

As the asset allocation strategy evolves year-after-year, diversification and risk mitigation will continue to be the pillars of MPERS' asset allocation structure.

NEPC, LLC appreciates the opportunity to serve as your consultant. It is a pleasure to work with MPERS and we look forward to continuing our relationship for the benefit of the Board, Staff, and most importantly, the members of the System.

Best Regards,

Kevin M. Leonard, Partner

Summary of Investment Policy

The primary objective of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS, Plan, or System) is to provide active and retired employees with the retirement benefits provided under Missouri law. The investment portfolio is constructed to generate a total return that, when combined with employer contributions, is sufficient to meet these benefit obligations. Following prudent standards for preservation of capital, the goal is to achieve the highest possible rate of return consistent with the Plan's tolerance for risk as determined by the Board of Trustees (Board) in its role as fiduciary. The Board has adopted the following guiding principles to fulfill its fiduciary duty:

1. Preserve the long-term corpus of the fund.
2. Maximize total return within prudent risk parameters.
3. Act in the exclusive interest of the members of the System.

Risk awareness and risk management are essential to any organization. MPERS' *Investment Policy* is the starting point for our investment risk management process. Through the *Investment Policy*, the Board has defined the desired goals and outcomes of the investment program, including provisions that:

- define the assumed rate of return for the portfolio (currently 6.5%);
- establish an asset allocation expected to meet the assumed rate of return while minimizing the volatility of the fund's contribution rates;
- define the approved asset classes and investment strategies;
- delegate the day-to-day management of the investment portfolio to MPERS' staff, consultants, and external asset managers;
- establish a range of asset class allocations from which the CIO can operate;
- establish procedures for hiring and terminating investment managers; and
- establish ongoing due diligence requirements for existing managers.

Throughout the *Investment Policy*, two key investment beliefs dominate the daily management of the investment portfolio.

1. Diversification is critical because the future is unknown.
2. Flexibility in investment policy implementation is critical because particular asset classes will be in or out of favor at various points in the economic cycle.

To ensure the fund is operating within the risk parameters established in the *Investment Policy*, staff monitor the performance of the fund relative to MPERS' policy index. The policy index is the return that would be generated if MPERS' portfolio was invested passively across the targeted asset allocation. MPERS' investment staff strive to achieve returns that are equal to or greater than the policy index while taking equal or less risk relative to the policy index (with risk defined by standard deviation of return). The following table shows how MPERS' portfolio compares to both the policy index and the median fund in MPERS' public fund peer universe as well as to commonly used risk measures.

Total Portfolio – Statistical Performance

Portfolio Characteristic	1-Year	3-Year	5-Year	10-Year	20-Year
Annualized Total Plan Return (net of all fees and expenses)	**8.88%**	**13.97%**	**9.50%**	**9.27%**	**8.32%**
Annualized Policy Benchmark Return	*6.43%*	*7.92%*	*7.30%*	*7.62%*	*7.46%*
Annualized Peer Median Return	*9.06%*	*7.37%*	*6.40%*	*7.10%*	*6.66%*
Total Plan Standard Deviation (1)	**8.63**	**7.29**	**7.47**	**5.73**	**7.31**
Policy Benchmark Standard Deviation	*11.04*	*8.53*	*9.06*	*6.57*	*7.30*
Peer Median Standard Deviation	*12.36*	*12.03*	*12.36*	*12.03*	*9.54*
Total Plan Sharpe Ratio (2)	**0.61**	**1.61**	**1.06**	**1.39**	**0.95**
Policy Benchmark Sharpe Ratio	*0.30*	*0.75*	*0.68*	*1.00*	*0.84*
Peer Median Sharpe Ratio	*0.44*	*0.55*	*0.44*	*0.65*	*0.59*
Correlation to Policy Benchmark (3)	**0.95**	**0.93**	**0.92**	**0.88**	**0.86**

(1) *Standard Deviation* measures historical volatility and specifically measures the dispersion of a set of data points (i.e., monthly returns from the mean). If the data points are further from the mean, the standard deviation is higher.

(2) *Sharpe Ratio* measures historical volatility and specifically measures the dispersion of a set of data points (i.e., monthly returns from the mean). If the data points are further from the mean, the standard deviation is higher.

(3) *Correlation* measures how the System's portfolio and the policy benchmark returns are related and if both have reacted to market forces in the same manner. The System's portfolio has a correlation of less than 1, indicating that while it will typically move in the same direction as the policy benchmark, it will not move in lockstep with the policy benchmark.

When evaluating these results, it is important to note that MPERS' policy index is comprised of a mix of asset classes, including several alternative asset classes, with benchmarks that are not investable (private equity with its S&P 500 + 3% illiquidity benchmark, real assets with its CPI + 4% real return benchmark, and the real estate benchmark). Notably, MPERS' targeted asset allocation has generated a 20-year policy benchmark return that ranks in the top 15% of the peer universe. It is also important to note that MPERS calculates actual performance on a net-of-fees basis, while acknowledging that most asset class benchmarks report performance on a gross-of-fees basis. Overcoming these investment management fees alone is a significant hurdle for staff to overcome. Couple these fees with a policy index that rates favorably with the broader public fund peer universe and one can see how well MPERS investment policy has served stakeholders of the System. Furthermore, MPERS' strong risk-adjusted performance illustrates the Board is fulfilling its fiduciary duty by adopting a prudent investment strategy, and MPERS' staff has done an excellent job of adding value over a very challenging policy benchmark.

Fair Value of Investments

As of June 30, 2023, MPERS' investment portfolio had a total fair value of $3.275 billion, representing an increase of $214 million from Fiscal Year 2022. Over the course of the year, $51 million was transferred out of the fund to pay benefit payments and meet other obligations. When viewed together, the net increase to the portfolio from investment activity equaled $265 million.

Investment Performance

MPERS' investment portfolio generated an 8.88% return for Fiscal Year 2023, net of all investment fees and based on time-weighted rates of return and market valuations. The performance across the major asset classes (and respective benchmarks) is listed below.

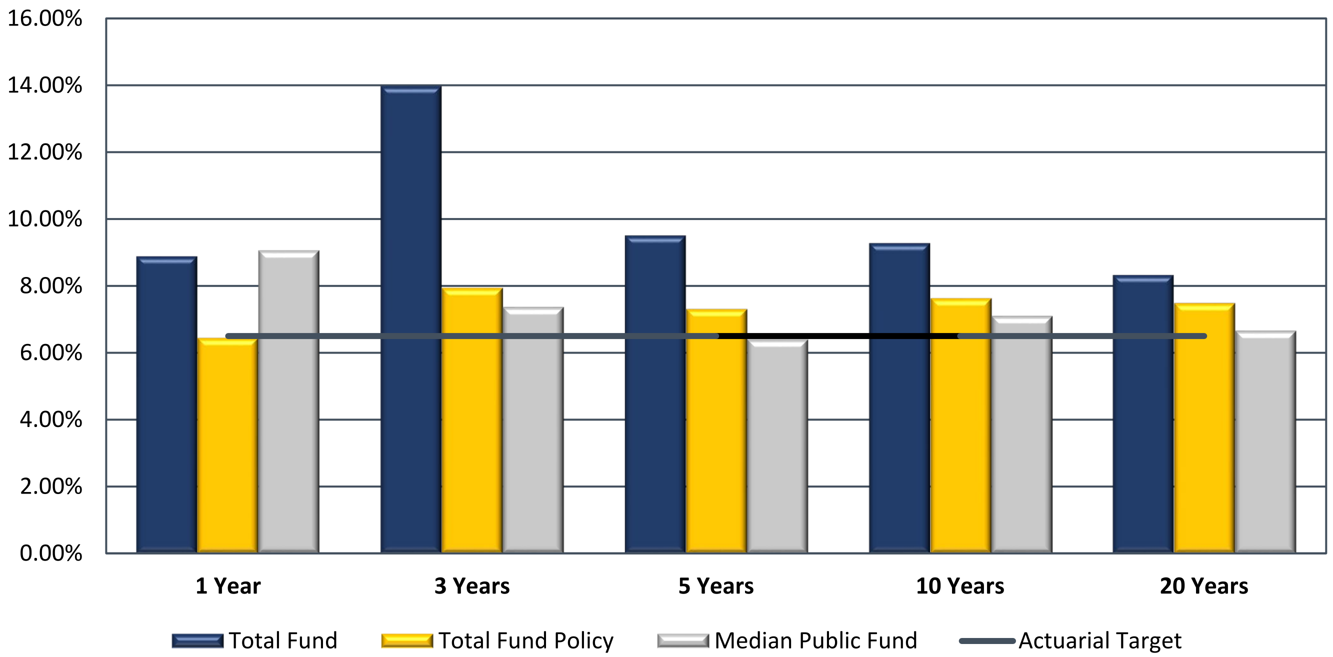
Investment Performance (Including Benchmarks)	1-Year	3-Year	5-Year	10-Year	20-Year
Total Fund	**8.88%**	**13.97%**	**9.50%**	**9.27%**	**8.32%**
Policy Benchmark	*6.43*	*7.92*	*7.30*	*7.62*	*7.46*
Peer Universe Ranking %	*55.00*	*1.00*	*1.00*	*1.00*	*1.00*
Equity Beta	**12.75**	**17.87**	**N/A**	**N/A**	**N/A**
*Equity Beta Benchmark**	*12.24*	*13.22*	*9.38*	*10.12*	*N/A*
Public Equity	**18.07**	**15.62**	**N/A**	**N/A**	**N/A**
MSCI ACWI	*16.53*	*10.99*	*8.10*	*8.75*	*8.17*
Private Equity	**1.27**	**22.86**	**17.39**	**15.74**	**N/A**
S&P 500 + 3%	*-4.94*	*22.12*	*14.50*	*15.58*	*N/A*
Rates and Credit Beta	**3.50**	**5.19**	**N/A**	**N/A**	**N/A**
*Rates and Credit Beta Benchmark**	*1.74*	*-2.30*	*1.61*	**N/A**	**N/A**
Traditional Fixed Income	**2.29**	**-1.27**	**2.99**	**4.26**	**4.79**
Barclays US AGG Gov/Credit	*-0.70*	*-4.11*	*1.03*	*1.66*	*3.03*
Opportunistic Debt	**5.46**	**15.28**	**9.34**	**N/A**	**N/A**
Barclays US Corp HY	*9.06*	*3.13*	*3.36*	*N/A*	*N/A*
Real Asset Beta	**7.11**	**15.80**	**N/A**	**N/A**	**N/A**
*Real Asset Beta Benchmark**	*-1.72*	*8.79*	*7.06*	*7.47*	*N/A*
Real Estate	**2.82**	**12.74**	**10.45**	**11.00**	**N/A**
NFI-ODCE	*-10.51*	*7.59*	*6.07*	*8.12*	*N/A*
Real Assets	**9.82**	**17.79**	**9.06**	**7.50**	**N/A**
CPI + 4%	*7.08*	*9.99*	*8.04*	*6.81*	*N/A*

Calculated based on the policy weights for each beta group and its benchmark return.

Note: All of MPERS' investment returns are reported net of all investment fees.

When evaluating performance, the Board of Trustees considers three primary performance objectives: 1) meet or exceed the actuarial assumed rate of return of 6.5% over long periods of time, 2) outperform a policy benchmark that represents the return that could be achieved by investing passively in the broad markets in the same percentages to MPERS' target asset allocation, and 3) rank at or above the public fund peer group's median investment return.

Historical returns compared to the three primary performance goals are listed graphically below:



Investment results for Fiscal Year 2023 were successful across all three performance goals; the fund exceeded the actuarial assumed rate of return, outperformed the policy benchmark return, and ranked consistent with the one-year peer group return and above its peer group return on a long-term basis. While a review of annual returns is an important exercise, MPERS' assets and liabilities are of a long-term nature so reviewing performance over longer periods is more critical and informative. With that in mind, MPERS' long-term investment results are extremely strong relative to the System's performance goals. Fiscal Year 2023 marks the first year MPERS can add a 20-year (net-of-fees) return to its long-term reporting package. The 20-year return of 8.32% exceeds the actuarial assumed rate of return over that period, ranks in the top 1% of the peer group and exceeds the policy benchmark return by 0.84% on an annualized basis. More subtly, but still important, is MPERS' policy benchmark return ranks in the top 15% of the peer group, which suggests that MPERS' Board established high expectations for investment results and MPERS' staff has exceeded those high expectations. Collectively, the 3-, 5-, 10-, and 20-year performance results all lead to the same conclusion: MPERS' returns exceed the actuarial assumed rate, a very difficult policy benchmark, and rank among the top of MPERS' public fund peer group. These results suggest the investment process (including both oversight and implementation) is working to the benefit of the System's members and sponsors.

Reviewing Fiscal Year 2023 in more detail shows that diversification and implementation flexibility remain key to MPERS' successful investment efforts. The overall fund return of 8.88% exceeded the policy return of 6.43%, with the difference of 2.45% coming from staff's active management decisions, which are authorized under the System's Investment Policy. The Investment Policy allows for staff's tactical use of leverage, which was utilized for the first time in Fiscal Year 2023. The use of leverage averaged 6.9% over the course of the fiscal year which added an extra 0.94% of return to the portfolio. Staff's choice of managers and tactical asset allocation positioning added an additional 1.5% to the return in Fiscal Year 2023.

Asset Allocation Overview

The Board of Trustees reviews MPERS' asset allocation annually, with a more formal asset/liability study completed at least every five years (the most recent study was completed in Fiscal Year 2020). The asset allocation in place today is a culmination of over 20 years of restructuring the portfolio with the goal of strong performance across various market environments, not just when the stock market is strong or on the rise. Those efforts have served the System well, generating consistent performance results with a lower risk profile (as measured by standard deviation of returns). MPERS' 5- 10-, and 20-year returns have a Sharpe ratio that ranks in the top 1% of the public fund peer universe (a Sharpe ratio measures a system's risk-adjusted returns or the amount earned for a given level of risk). The reduced volatility in the portfolio has also lowered the volatility of contribution rates for the employers, which have now remained stable for over 10 years after climbing considerably following the financial crisis.

MPERS' breaks down all investment strategies into three broad beta groups (equities, interest rates and credit, and real assets). As of June 30, 2023, all the sub-asset class allocations were within the acceptable ranges established by MPERS' *Investment Policy*. The table below lists the ending allocations as of June 30, 2022, along with the target and actual asset allocation as of June 30, 2023. Following the table are descriptions of each beta group and its underlying assets.

Beta Group *Sub-Asset Allocation*	June 30, 2022 Ending Allocation	June 30, 2023 Target Allocation	June 30, 2023 Ending Notional Value Allocation	June 30, 2023 Ending Fair Value Allocation
Equity Beta	**49.99%**	**50.00%**	**49.19%**	**47.79%**
Public Equity	*34.08*	*40.00*	*36.64*	*33.91*
Private Equity	*15.91*	*10.00*	*12.55*	*13.88*
Rates and Credit	**26.62**	**30.00**	**29.31**	**32.41**
Traditional Fixed Income	*15.76*	*22.50*	*19.84*	*21.94*
Opportunistic Debt	*10.86*	*7.50*	*9.47*	*10.47*
Real Assets	**23.02**	**20.00**	**21.40**	**23.67**
Real Assets	*14.26*	*10.00*	*12.72*	9.60
Real Estate	*8.76*	*10.00*	*8.68*	14.07
Cash	**0.37**	**0.00**	**0.10**	**-3.87**

Equity Beta

The equity beta group is comprised of two asset types: public equity and private equity. The equity beta group currently represents 49.19% of the overall portfolio. Within that overall equity allocation, the fund is overweight private equity structures (12.55% versus the target of 10%), which is offset by an underweight to public equity (36.64% versus the target of 40%). The result of the current positioning is an underweight to the traditional equity markets. The equity beta group returned 12.75% for Fiscal Year 2023. Both equity beta group components, public and private equity, exceeded the respective benchmarks for Fiscal Year 2023.

Public Equity

MPERS' public equity portfolio ended Fiscal Year 2023 with an 18.07% return, outperforming the global equity policy benchmark which rose in value by 16.53%. Public equity portfolio performance is divided into two sub-components - diversified beta and active managers. For Fiscal Year 2023, the diversified beta component (which is about 90% of the assets invested) returned 20.81% relative to the benchmark return of 16.53% (MSCI ACWI). The active manager component underperformed the benchmark with a 6.89% return, largely due to one active strategy focusing on small regional banks. Regional banks underperformed during the year due to the fear surrounding banks after the failure of Silicon Valley Bank and Signature Bank in March 2023. That strategy has performed well over longer time periods, exceeding the benchmark over three years by 6.7%.

Private Equity

Private equity returned 1.27% for Fiscal Year 2023, outperforming the benchmark return (S&P 500 + 3%) of -4.94%. While this was a tough year for private equity, it continues to be the best performing asset class over a 10-year period, returning 15.74% versus the benchmark return of 15.58%. Given that the benchmark includes a return premium to compensate for the illiquidity risk inherent in the asset class structure (3% compounded annually), its contribution has been very beneficial to the overall return of the plan.

Private equity underwent a significant transformation in Fiscal Year 2023. For years, private equity thrived on the back of low interest rates which helped propel its growth. However, with the Federal Reserve aggressively raising interest rates, the path to growth has become much more challenging. MPERS' focus on managers who build and create organic growth has proven highly successful, as even in a challenging economic climate, MPERS' investment portfolio continues to create value. The private equity portfolio remains cash flow positive even in a slower transaction environment.

Rates and Credit Beta

The rates and credit beta group consists of the traditional fixed income portfolio and the opportunistic debt portfolio. The overall allocation stands at 29.31% versus the target of 30%. During Fiscal Year 2023, this beta group returned 3.50% versus the benchmark of 1.74%. On a more granular level, the traditional fixed income subcomponent delivered a 2.29% return (versus the benchmark of -0.70%), while the opportunistic debt subcomponent gained 5.46% (versus the benchmark of 9.06%).

Traditional Fixed Income

Although its exposure increased from Fiscal Year 2022, MPERS remained consistently underweight the traditional fixed income target allocation throughout Fiscal Year 2023 and ended the year with a 19.84% allocation (compared to the target asset allocation of 22.5%). Yields on U.S. Treasury bonds rose during the year, with the 10-year Treasury bond rising from 2.97% to 3.84% and the 30-year Treasury bond rising from 3.12% to 3.86%. This increase was not as dramatic compared to the previous year, but ultimately led to weak total returns in traditional fixed income (yields and prices have an inverse relationship within fixed income). The benchmark for traditional fixed income returned -0.7%, but the portfolio outperformed that benchmark with a return of 2.29%. The unique structure and lower duration profile of MPERS' traditional fixed income portfolio (relative to the benchmark) led to positive returns in a difficult environment and outperformed the policy benchmark by 2.99%.

A key result from the spike in interest rates is the resurgence of traditional fixed income as a viable investment strategy. Yields on government-guaranteed fixed income instruments are now approaching MPERS' actuarial target of 6.5%. These yields have not been observed since the early 2000s, when the System's actuarial return target was 8.25%. Staff used this as an opportunity to increase the overall allocation to high quality fixed income and expect the trend will continue if rates stabilize at current levels or increase further.

Opportunistic Debt

The offset to MPERS' underweight position to traditional fixed income is a modest overweight position of opportunistic debt strategies. The year began with a 10.86% allocation relative to a 7.5% policy target and ended at 9.47%. The asset class generated a 5.46% return, which underperformed the publicly traded high yield benchmark return of 9.06%, however, the underperformance this year should be viewed within the context of a 12% and 6% outperformance over the 3- and 5-year periods, respectively.

The opportunistic debt portfolio is diversified among direct lending, public market investments, and distressed investments. The portfolio is largely built out and most of the focus in recent years has been on pivoting commitments away from direct lending and toward strategies that have flexibility to be more opportunistic. Recent commitments to opportunistic strategies were made in anticipation of a more volatile environment in future years. Many of those strategies continue to have dry powder (ability to deploy new capital) and staff expects those strategies to benefit from continued uncertainty in the global economy. The pace of new commitments is expected to be in line with past years and should be partially funded by rotating exposure from underperforming legacy investments to strategies expected to benefit in a more uncertain economic environment.

Real Assets Beta

The broad real assets beta group includes MPERS' real estate holdings along with other real asset-backed strategies (such as energy, infrastructure, timber, and mining). The overall allocation to the real assets beta group stands at 21.40% (relative to the target allocation of 20%) and generated a 7.11% return (versus a benchmark of -1.72%) in Fiscal Year 2023. The real asset strategies returned 9.82% for the year (versus the benchmark of 7.08%), with the various real estate strategies producing a 2.82% return (versus the benchmark of -10.51%).

Real Estate

The underlying real estate allocation has a target of 10% of assets and includes a mix of public and private equity strategies, as well as tactical exposures to public and private debt strategies. MPERS started the year with an 8.76% allocation and ended with an 8.68% allocation. The portfolio generated a 2.82% return for the year, outperforming the policy benchmark return of -10.51%. The core real estate portfolio (primarily stabilized and fully leased properties) generated a -10.35% return, while the non-core portfolio (value-added or opportunistic real estate strategies) returned 7.50%.

As we stated last year, the headwinds to "bricks and mortar" real estate were strong. Employers continue to adapt to the "post-COVID" work environment and while more employers required a return to the office this year, office vacancies are still very high in most major U.S. cities. Higher interest rates are another challenge to real estate. Debt financing is typically a key dynamic in the real estate market and with debt now more expensive to carry, many properties are "underwater," i.e., the interest expense exceeds the

rental income received by tenants. Staff recognized this risk shortly after the onset of COVID and did two things. The first action was to reduce focus on core real estate investing and the underlying exposure to office buildings. The second action was to steer real estate investment towards the resurging retail shopping center markets that serve local communities. Both actions served the System well in Fiscal Year 2023 and were large contributors to the outperformance within the real estate sector.

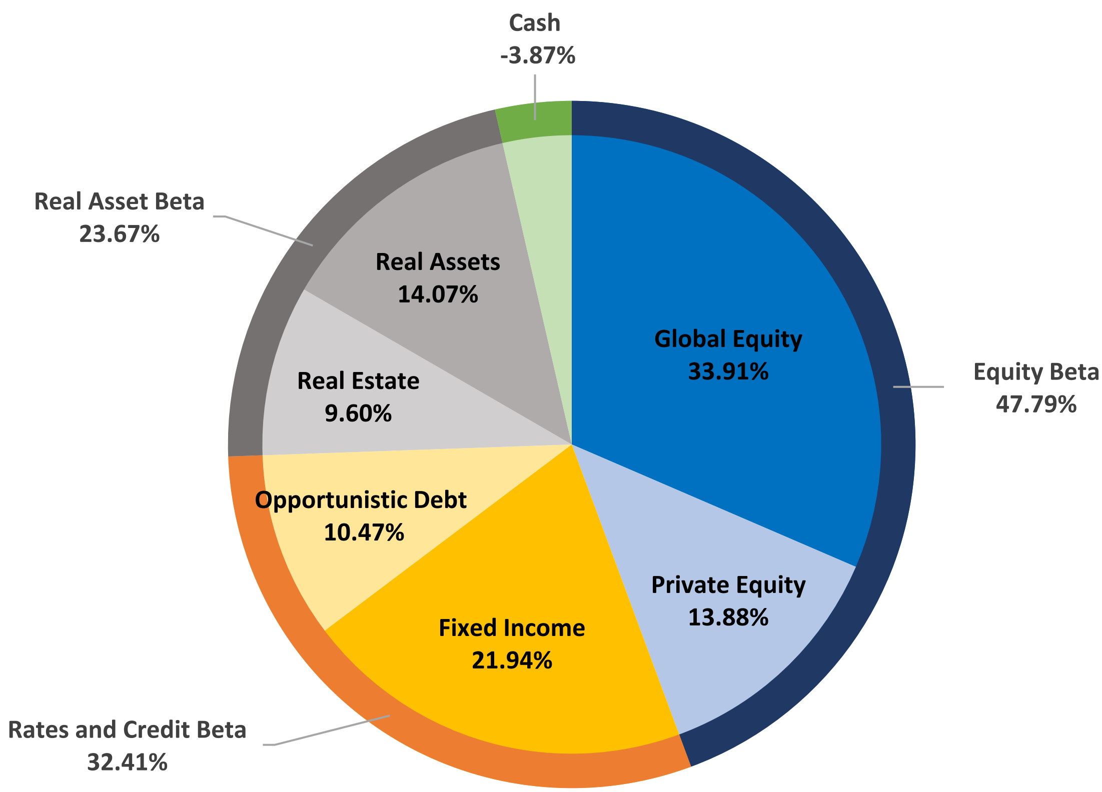
Real Assets

The underlying real asset allocation has a target of 10% of assets and includes a mix of natural resource strategies, infrastructure and transportation, and timber strategies. MPERS started the year with a 14.26% allocation, which decreased throughout the year and ended with a 12.72% allocation. The portfolio continues to benefit from the current inflationary environment, generating a 9.82% return for the year and outperforming the policy benchmark return of 7.08%. The natural resources portfolio was down 3.68% on the year largely due to a few underperforming energy investments that gave back some of last year’s strong gains. MPERS’ infrastructure strategies had another consistent year and produced a return of 13.57%. After rising 29.7% the previous year, the timber portfolio was up another 43.6% in Fiscal Year 2023 led by strong realized land sales in Tennessee and Montana. The timber portfolio now has a five-year annualized return of 16.1%, which is the second highest returning asset class behind private equity over the past five years. The timber portfolio, which started out as a pilot program, has turned into a real differentiator within the broader real assets portfolio and has produced meaningful excess returns at the total fund level.

Looking Forward

The key addition to this year’s report is the inclusion of 20-year (net of fees) risk and return statistics. Within any long-term cycle there are shorter-term periods of both success and failure. Market cycles come and go, and a transition period will never be perfectly timed. Good long-term investors stick to solid fundamental investing but are always mindful of changing investment climates. As we look forward to Fiscal Year 2024 and beyond, the market environment seems to be transitioning once again. With inflation and long-term Treasury yields at levels not seen since 2007, investors will certainly start to consider shifting to safer fixed income strategies over the riskier private and public equity strategies that performed so well over the past decade. It very well could be the beginning of a new era where “simpler is better” and investors migrate back to traditional stocks and bonds to deliver attractive investment results. Regardless, MPERS has a governance model that provides staff with the flexibility to adapt to the changing investment markets. MPERS’ diversified asset allocation is designed to perform well throughout a wide range of investment markets, and staff are confident the portfolio is well positioned to meet the long-term goals of the System.

Investment Summary



Amounts Reported by Beta Groups and Management-Type Allocation
June 30, 2023

	Fair Value	Percent of Fair Value
Global Equity		
Global Public Equity	$ 1,110,697,389	33.91%
Private Equity	454,431,253	13.88%
Rates and Credit		
Fixed Income	718,485,081	21.94%
Opportunistic Debt	343,070,440	10.47%
Real Assets		
Real Estate	314,321,128	9.60%
Real Assets	460,801,184	14.07%
Cash	(126,639,526)	-3.87%
Total Investments	$ 3,275,166,949	**100.00%**
Reconciliation to Statement of Plan Net Assets:		
Less: Accrued Investment Interest and Income	$ (13,449,780)	
Less: Investment Sales Receivable	(19,229,893)	
Plus: Investment Purchases Payable	24,418,544	
Currency Adjustment	20,730	
	$ 3,266,926,550	

Largest Equity Securities (Non-Commingled Funds)

Security	Fair Value	Percent of Total
CF OWL ROCK TECHNOLOGY FINANCE CORP	$10,926,456	6.4761%
GRANITE RIDGE RES INC COM	8,723,482	5.1704
BANCORP INC DEL COM STK	2,957,045	1.7526
BARINGS BDC INC COM	2,919,788	1.7306
STERLING BANCORP INC COM	2,622,810	1.5545
WINTRUST FINL CORP COM	2,619,040	1.5523
OAKTREE SPECIALTY LENDING CORP	2,598,335	1.5400
PENNANTPARK INVT CORP COM	2,536,576	1.5034
NORTHEAST BK LEWISTON ME COM	2,524,785	1.4964
ARES CAP CORP COM	2,519,006	1.4930

Largest Fixed Income Securities (Non-Commingled Funds)

Par Value	Security	Fair Value
$31,581,479	SLM STUD LN TR FLTG RT 6.95514% DUE 07-25-2023	$31,546,016
21,597,862	SOUTH CAROLINA STUDENT LN CORP EDUCATIONLN REV BD 2014 SER A-2 01-03-2033 REG	21,562,917
17,500,000	PVTPL SLM STUDENT LN TR 2012-8 SER 12-8 CL B FLTG RT DUE 04-28-2070 BEO	16,089,448
15,759,358	BRAZOS HIGHER ED AUTH INC 02-25-2035 REG	15,711,104
15,000,000	MTN COML MTG TR FLTG RT 6.7169% DUE 03-15-2039	14,718,642
14,283,637	PVTPL BRAZOS ED LN AUTH INC SER 18-1 CL A1 FLT RT DUE 01-25-2068 BEO	14,088,328
15,000,000	FEDERAL FARM CREDIT BANK 4.2% DUE 04-07-2036 REG	13,596,851
12,050,000	NORTHSTAR ED FIN INC DEL 2007-1 STUDENT LN ASSET BKD NT CL 1A-6 01-29-2046 BEO	11,930,354
10,000,000	UNITED STATES OF AMER TREAS BONDS 0.75 DEB TIPS 02-15-2042	11,400,825
11,579,353	PVTPL ECMC GROUP STUDENT LN TR SR 17-2A CL A FLTG RT 05-25-2067	11,233,076
10,979,555	GNMA SER 23-55 CL B 6% 03-20-2053	11,029,663
891,917	MFO PIMCO PAPS ASSET BACKED SECURITIES	10,292,721
10,420,892	PVTPL ECMC GROUP STUDENT LN TR 2016-1 CLA 144A VAR RT DUE 07-26-2066 BEO	10,278,720
10,000,000	J P MORGAN CHASE COML MTG SECS TR 5.129%08-15-2039	10,003,017
10,000,000	PVTPL FS RIALTO 2022-FL5 ISSUER LLC SR 22-FL5 CL A VAR RT 06-19-2027	9,941,003
10,000,000	RIAL 2022-FL8 VAR RT 0% DUE 12-31-2037	9,849,985
10,000,000	BX TR 2022-VAMF COML MTG PASS THRU CTF CL A 6.16048% 01-15-2039	9,717,793
10,000,000	BX TR 2021-LBA FLTG RT 6.22548% DUE 02-15-2036	9,681,514
9,694,925	PVTPL ED LN AST-BACKED TR I 2013-1 SR NTCL A2 144A VAR RT DUE 04-26-2032 BEO	9,598,530
9,504,328	PVTPL EFS VOLUNTEER NO 3 LLC STUDENT LN SER 2012-1 CL A-3 FLTG RT 04-25-2033	9,427,020

Space restrictions make it impractical to include the entire investment portfolio in this report. However, a portfolio listing is available for review in the office of the executive director of MPERS.

Investment Fees

Historically, MPERS has reported investment management fees and accrued incentive fees (performance fees), and in the last several years MPERS has expanded reporting to include fund pass-through expenses and portfolio company expenses. MPERS reports returns net of all fees and expenses; the additional fee categories reported have no impact on investment performance or returns. Comparing fees among peers is challenging given the lack of industry standard governing fee reporting. MPERS has taken a very conservative approach and reports all fees.

The strongest driver of fees is MPERS' asset allocation and use of private assets. Private assets have served an important role in MPERS' asset allocation including diversification and alpha generation. MPERS continues to monitor fees during the manager due diligence process and considers fees to be one factor when making investment decisions. MPERS strives to produce the highest net-of-fee returns regardless of the investment structure.

Summary of Investment Expenses
For the Year Ended June 30, 2023

Investment Expenses	
Management and Performance Fees by Asset Class	
Equities	$ 1,497,705
Fixed Income Core	100,856
Opportunistic Debt	5,080,628
Real Estate	5,218,402
Private Equity	6,628,339
Real Assets	5,922,691
Hedge Funds	2,424,461
Total Management and Performance Fees	**$26,873,082**
Investment Custodial Fees	$ 78,926
Performance Management	218,258
General Consultant (Monitoring) Fee	355,000
Professional Fees	465,338
Interest Expense	4,705,746
Other Fees / Expenses	(258,014)
Total Investment Expenses	**$32,438,336**

Expenses Accrued, Fiscal Year 2023

Manager	Base Fees	Performance Fees	Pass Through Fund Expenses (1)	Portfolio Company Expenses (2)	Total
ABRY Partners	$ 12,226	(154,307)	4,270	0	$ (137,811)
Aisling Capital	134,116	0	23,503	0	157,619
American Infrastructure MLP	23,683	0	27,913	0	51,596
American Timberlands Company	253,937	0	0	0	253,937
Anchorage Capital Group	223,435	(1,380,045)	0	0	(1,156,610)
Apollo Aviation Group	0	0	1,582	0	1,582
Ares Management	314,941	0	27,337	0	342,278
Arrowroot Capital	335,246	(185,417)	(512,330)	0	(362,501)
Banner Ridge Partners	1,011,473	1,805,467	27,743	0	2,844,683
Blackstone Alternative Asset Management	447,165	(1,574,604)	263,561	0	(863,878)
Blackstone	956,767	375,645	0	0	1,332,412
Blue Road Capital	207,900	322,786	39,542	0	570,228
Bridgewater Associates	194,717	38,738	11,504	0	244,959
Carlyle Aviation Partners	82,429	203,468	0	0	285,897
CarVal Investors	56,694	(355,102)	0	0	(298,408)
CatchMark Timber	19,640	602,656	0	0	622,296
CBRE Investors	183,728	336,499	19,264	0	539,491
Centersquare Investment Management	567,991	0	0	0	567,991
CIM Group	286,866	977,354	65,295	0	1,329,515
Clarion Partners	17,659	0	0	0	17,659
Corrum Capital	255,680	1,058,021	245,551	0	1,559,252
DC Capital	122,500	261,450	101,592	0	485,542
Drive Capital	817,356	(1,727,351)	24,455	0	(885,540)
Dyal Capital Partners	400,000	191,922	69,885	0	661,807
Energy & Mineral Group	518,316	(124,232)	53,639	0	447,723
Fortress Investment Group	89,884	(174,565)	79,991	0	(4,690)
Francisco Partners	166,037	(19,592)	143,209	0	289,654
Golden Sciens Marine Investments Ltd	83,676	0	19,613	0	103,289
Grey Rock Energy Partners	289,668	(4,349,586)	183,242	0	(3,876,676)
Grove Street Advisors	260,000	(1,064,984)	0	0	(804,984)
GSO Capital Opportunities	231,877	54,008	77,674	0	363,559
Heartwood Partners	24,591	547,793	28,796	0	601,180
Kennedy Capital	925,885	0	0	0	925,885
KKR	108,320	(110,921)	39,481	0	36,880
KPS Capital Partners	13,622	1,833,945	56,191	0	1,903,758
Long Ridge Equity Partners	81,609	1,765,115	184,583	0	2,031,307
Longford Capital Management	612,935	177,635	72,844	0	863,414
Luxor Capital Group	(14,934)	0	5,694	0	(9,240)

Continued on next page.

(1) *Fund Pass Through Expenses* are administrative expenses charged to the fund and paid by the limited partners (or investors, including MPERS), in addition to the management fee. These expenses may include, but are not limited to, accounting, audit, legal, and custody expenses directly related to the administration of the underlying fund investments.

(2) *Portfolio Company Expenses* are fees or costs paid to the general partners (fund managers) of private equity funds which are not applied as offsets to gross management fees. These charges are paid by the underlying portfolio companies of the funds, and therefore, are indirectly paid by MPERS.

Expenses Accrued, Fiscal Year 2023 (continued)

Manager	Base Fees	Performance Fees	Pass Through Fund Expenses [1]	Portfolio Company Expenses [2]	Total
M&G Investments	$ (10,445)	$ (29,180)	$ 4,885	$ 0	$ (34,740)
Mercato Partners	555,049	40,425	140,501	0	735,975
MGG Investment Group	176,132	(84,486)	69,278	0	160,924
Millennium Management	694,188	162,142	0	0	856,330
Miravast	270,116	(242,376)	36,985	0	64,725
Monomoy Capital Partners	0	563,215	14,438	0	577,653
Natural Gas Partners	135,904	1,098,578	20,848	0	1,255,330
New Mountain Capital	430,627	172,092	209,105	0	811,824
NewQuest Capital Partners	112,405	(442,754)	36,466	0	(293,883)
Nexus Capital Management	344,069	0	0	0	344,069
Northern Shipping	50,032	127,617	2,328	0	179,977
Oak Street Real Estate	74,032	141,927	(41,526)	0	174,433
OCP Asia Limited	400,181	(277,885)	202,119	0	324,415
Octagon Credit Investors	131,349	0	0	0	131,349
OpenGate Capital	165,566	737,495	51,362	0	954,423
Orion Mine Finance Group	299,909	133,204	105,755	0	538,868
Owl Rock Capital Partners	181,358	86,912	72,207	0	340,477
Parametric	506,920	0	0	0	506,920
Pfingsten Partners	31,911	1,352,738	5,476	0	1,390,125
PIMCO	64,900	0	0	0	64,900
Principal Global Investors	868,520	0	0	0	868,520
Quantum Energy Partners	164,959	456,495	52,959	0	674,413
Ridgewood Energy	410,746	380,307	101,346	0	892,399
Riverstone Credit Partners	171,791	248,372	34,379	0	454,542
Sculptor Real Estate	525,842	603,410	109,883	0	1,239,135
Shore Capital Partners	0	0	49,389	0	49,389
Shoreline Capital	4,690	0	0	0	4,690
Silver Point Capital	340,198	(222,719)	58,161	0	175,640
Stockdale Capital Partners	285,709	195,578	94,341	0	575,628
Timberland Investment Resources	370,846	0	0	0	370,846
Torchlight Investors	26,141	(188,524)	17,368	0	(145,015)
Tristan Capital Partners	417,195	202,416	204,398	0	824,009
Turnbridge Capital Partners	94,829	0	23,274	0	118,103
Varde Asia	183,061	49,662	46,557	0	279,280
Vectis	15,000	(1,238)	8,589	0	22,351
Total Manager Expenses	**$18,811,367**	**$ 4,645,221**	**$ 3,416,494**	**$ 0**	**$26,873,082**
Professional Expenses					
Investment Custodial Fee	$ 78,926	$ 0	$ 0	$ 0	$ 78,926
Performance Management	218,258	0	0	0	218,258
General Consultant (Monitoring) Fee	355,000	0	0	0	355,000
Professional Fees	465,338	0	0	0	465,338
Interest Expense	4,705,746	0	0	0	4,705,746
Other Investment Expenses	(258,014)	0	0	0	(258,014)
Total Professional Expenses	**$ 5,565,254**	**$ 0**	**$ 0**	**$ 0**	**$ 5,565,254**
Total Investment Expenses	**$24,376,621**	**$ 4,645,221**	**$ 3,416,494**	**$ 0**	**$32,438,336**

Brokerage Firm	Total Commission	Number of Shares	Commission Rate
THE NORTHERN TRUST COMPANY	$143,408	7,105,131	$0.0202
NORTHERN TRUST SECURITIES, INC.	5,681	284,034	0.0200
RAYMOND JAMES & ASSOCIATES, INC.	4,883	202,068	0.0242
INTL FCSTONE FINANCIAL, INC.	3,332	180,746	0.0184
STIFEL, NICOLAUS & COMPANY, INCORPORATED	2,311	3,523,982	0.0007
NATIONAL FINANCIAL SERVICES, LLC	1,215	50,252	0.0242
WELLS FARGO SECURITIES, LLC	818	10,534,313	0.0001
MORGAN STANLEY AND CO., LLC	588	49,737,531	0.0000
BMO CAPITAL MARKETS CORP	457	1,021,465	0.0004
ROBERT W. BAIRD CO. INCORPORATED	372	32,040	0.0116
RBC DOMINION SECURITIES, INC.	301	14,514	0.0208
CREDIT SUISSE EQUITIES (AUSTRALIA)	242	67,142	0.0036
WELLS FARGO BANK, N.A.	214	13,296,399	0.0000
GOLDMAN, SACHS AND CO.	205	3,039,883	0.0001
ISI GROUP, INC.	205	20,506	0.0100
KEMPEN AND CO N.V.	200	3,743	0.0535
INSTINET EUROPE LIMITED	196	10,619	0.0184
HSBC SECURITIES (USA), INC.	194	271,778	0.0007
DBS VICKERS SECURITY PTE	184	179,376	0.0010
Others	3,021	6,573,149,746	0.0000
Total	**$168,027**	**6,662,725,268**	
Average Commission Rate			**$0.0000**

MSHP and MoDOT Employees
Security and safety for the people of Missouri.

Actuarial Section

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September 14, 2023

Retirement Board
Missouri Department of Transportation
and Highway Patrol Employees' Retirement System
1913 William Street
Jefferson City, Missouri 65102

Ladies and Gentlemen:

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report. This report should not be relied on for any purpose other than the purpose described.

The basic financial objective of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS) is to establish and receive contributions which:

(1) When expressed in terms of percents of active member payroll, will remain approximately level from generation to generation of Missouri citizens; and
(2) When combined with present assets and future investment returns, will be sufficient to meet the present and future financial obligations of MPERS.

In order to measure progress toward this fundamental objective, MPERS has annual actuarial valuations performed. The valuations: (i) measure the present financial position; and (ii) establish contribution rates that provide for the current cost and level percent-of-payroll amortization of unfunded actuarial liabilities over a reasonable period. An actuarial valuation was performed based upon benefit conditions, data and assumptions as of June 30, 2023. This valuation indicates that contribution rates for the period beginning July 1, 2024 that are at least equal to the calculated contribution rates will meet the Board's financial objective. The calculated contribution rates are 52.01% of payroll for the 5,499 Non-Uniformed employees and 58.49% of payroll for the 1,122 Uniformed Patrol employees.

The plan administrative staff provides the actuary with data for the actuarial valuation. The actuary relies on the data after reviewing it for internal and year to year consistency. Member data was not audited by the actuary. The actuary summarizes and tabulates population data in order to analyze longer term trends. We are not responsible for the accuracy or completeness of the data provided by MPERS.

One Towne Square | Suite 800 | Southfield, Michigan 48076-3723

Retirement Board
September 14, 2023
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Gabriel, Roeder, Smith & Company was responsible for the following schedules found in the Actuarial Section:

- Summary of Actuarial Assumptions and Methods
  - Probabilities of Separation from Active Employment
  - Individual Salary Increases
  - Joint Life Retirement Values
  - Probabilities of Retirement for Members
  - Probabilities of Disability for Members
- Summary of Member Data Included in Valuations
  - Active Members by Attained Age and Years of Service
  - Schedule of Active Member Valuation Data
- Solvency Test
- Derivation of Financial Experience
- Schedule of Retirees and Beneficiaries Added and Removed
- Summary of Plan Provisions
- Legislative Changes

Gabriel, Roeder, Smith & Company was responsible for the following schedules found in the Financial Section:

- Schedule of Changes in the Employer's Net Pension Liability
- Schedule of Employer's Net Pension Liability
- Schedule of Employer Contributions
- Schedule of the Actuarially Determined Contributions

Actuarial valuations are based upon assumptions regarding future activity in specific risk areas including the rates of investment return and payroll growth, eligibility for the various classes of benefits, and longevity among retired lives. These assumptions are adopted by the Board. The assumptions and the methods comply with the requirements of the Governmental Accounting Standards Board (GASB). Each actuarial valuation takes into account all prior differences between actual and assumed experience in each risk area and adjusts the contribution rates as needed. Actuarial methods and assumptions were adopted by the Board pursuant to the June 30, 2022 Experience Study. Gabriel, Roeder, Smith & Company has produced the following reports as of June 30, 2023:

- Annual Actuarial Valuation Report
- GASB Statement Nos. 67 and 68 Valuation Report

In order to gain a full understanding of the condition of this Plan, these reports should be read in their entirety.

To the best of our knowledge, this report is complete and accurate and was made in accordance with standards of practice promulgated by the Actuarial Standards Board. The assumptions and methods used for funding purposes meet the parameters set by Actuarial Standards of Practice. The actuarial assumptions used for this valuation produce results which, individually and in the aggregate, are reasonable.

Retirement Board
September 14, 2023
Page 3

The employer contributions determined in this report are based on the Board funding policy. This policy is discussed on page 4 of the annual actuarial valuation report. We commend the Board for its aggressive monitoring and updating of the funding policy over the recent past. However, continued employer contributions at the current level do not guarantee benefit security. We, therefore, encourage the Board to continue to routinely monitor and update its funding policy and to continue to consider benefit security when doing so.

The annual actuarial valuation report includes risk measures on pages A-13 and A-14, but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We recommend that the Board consider performing an analysis to assess risk related to investment and payroll.

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. Heidi G. Barry and Jamal Adora are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The signing actuaries are independent of the plan sponsor.

Based upon the valuation results, it is our opinion that the Missouri Department of Transportation and Highway Patrol Employees' Retirement System continues to operate in accordance with actuarial principles of level percent-of-payroll financing. It is important to the well-being of the System that it continues to receive contributions at the actuarially determined levels. It is also important to continue to monitor both the total funded status and the funded status of the retiree liabilities to ensure that the funding policy is consistent with the expected life span of the respective unfunded obligation.

Respectfully submitted,
Gabriel, Roeder, Smith & Company

Heidi G. Barry

Heidi G. Barry, ASA, FCA, MAAA

Jamal Adora

Jamal Adora, ASA, EA, MAAA

Valuation Date	June 30, 2023
Actuarial Cost Method	Entry Age
Amortized Method	Closed, level percent-of-payroll
Remaining Amortization Period	16 years
Asset Valuation Methods	3-year smoothed fair value; 20% Corridor
Actuarial Assumptions	
Investment Rate of Return	6.50%
Projected Salary Increase	3.00% to 10.50%
Cost-of-Living Adjustments	1.80% Compound
Includes Wage Inflation at	3.00%

An actuarial valuation is based upon an actuarial cost method, an asset valuation method, and actuarial assumptions. These methods and assumptions are chosen by the Board of Trustees after consultation with the Actuary and other advisors.

The actuarial cost method is called the Entry Age Actuarial Cost Method. This method is consistent with the Board's level percent-of-payroll funding objective. With this method, the level percent-of-payroll is determined that will fund a member's retirement benefit over the member's entire working lifetime, from date of hire (Entry Age) to date of exit from the active member population. Differences in the past between assumed and actual experience become part of unfunded actuarial accrued liabilities and are amortized with level percent-of-payroll contributions. This cost method was first used in the June 30, 1999 valuation.

The asset valuation method is a three-year smoothed fair value method in which assumed investment return is recognized immediately each year and differences between actual and assumed investment return are phased-in over a closed three-year period. This asset valuation method is intended to give recognition to the long-term accuracy of market values while filtering out and dampening short-term market swings. This method was first used in the June 30, 1999 valuation.

The actuarial assumptions used in producing the valuation fall into two broad classes: economic assumptions and demographic assumptions. Economic assumptions refer to long-term rates of investment return, wage growth, covered population growth, and inflation. Demographic assumptions refer to retirement rates, turnover rates, disability rates, merit and seniority pay increases, and mortality rates. The current assumptions are based upon a 2017-2022 study of experience. The assumptions are reviewed from time to time to keep them reasonably current with expected experience. The next experience study is scheduled to follow the June 30, 2027 valuation.

Economic Assumptions

The investment return rate used in making the valuation was 6.50% per year, compounded annually (net after administrative expenses). This rate of return is not the assumed real rate of return. The real rate of return over wage inflation is defined to be the portion of investment return which is more than the wage inflation rate. Considering wage inflation recognition of 3.00%, the 6.50% rate translates to an assumed real rate of return over wage inflation of 3.50%. This rate was first used for the June 30, 2021 valuation.

Pay increase assumptions for individual active members are shown on Table I. Part of the assumption for each year of service is for a merit and/or seniority increase, and the other 3.00% recognizes wage inflation. These rates were first used for the June 30, 2023 valuation.

Price Inflation is assumed to be 2.25%. The COLA is assumed to be 80% of the price inflation assumption. This results in a 1.80% annual COLA assumption (Closed Plan members hired prior to August 28, 1997 receive a minimum 4% COLA. These increases are made until the total of the increases reaches 65% of initial benefit at which time the increases will have the minimum removed). It is assumed that the 1.8% COLA will always be paid. All COLAs are assumed to be paid on the anniversary of retirement.

The Active Member Group size is assumed to remain constant at its present level.

The active member payroll for all members is assumed to increase 3.00% annually.

Non-Economic Assumptions

Post-Retirement Healthy Mortality Rates are used to measure the probabilities of members dying after retirement. The rates currently in use are from the Pub-2010 General, Healthy Retiree, Amount-Weighted, Below-Median Income tables for males and females for Non-Uniformed members and Pub-2010 Public Safety Healthy Retiree, Amount-Weighted, tables for males and females for Uniformed members. Rates are decreased by 5% for non-uniform males and increased by 4% for uniform males. The assumed rates are adjusted for mortality improvement back to the observation period base year of 2010 and then projected generationally from 2010 to 2019 using scale MP-2021 and 90% of scale MP-2021 for years following 2019. Sample rates are shown on Tables II and III. These rates were first used in the June 30, 2023 valuation.

Post-Retirement Disabled Mortality Rates. The rates currently in use for disabled lives are the Pub-2010 General Disabled Retiree, Amount-Weighted tables for males and females for Non-Uniformed members and the Pub-2010 Public Safety Disabled Retiree, Amount-Weighted tables for males and females for Uniformed members. The assumed rates are adjusted for mortality improvement back to the observation period base year of 2010 and then projected generationally from 2010 to 2019 using scale MP-2021 and 90% of scale MP-2021 for years following 2019. Sample rates are shown on Table IV and V. These rates were first used in the June 30, 2023 valuation.

Pre-Retirement Mortality Rates. The rates currently in use for active lives are the Pub-2010 General, Employee, Amount-Weighted, Below-Median Income tables for males and females for Non-Uniformed members and the Pub-2010 Public Safety Employee, Amount-Weighted, tables for males and females for Uniformed members. The assumed rates are adjusted for mortality improvement back to the observation period base year of 2010 and then projected generationally from 2010 to 2019 using scale MP-2021 and 90% of scale MP-2021 for years following 2019. Sample rates are shown on Table VI and VII. These rates were first used in the June 30, 2023 valuation.

The probabilities of retirement for members eligible to retire are shown on Table IX. The rates for full retirement were first used in the June 30, 2023 valuation. The rates for reduced retirement were first used in the June 30, 2023 valuation. Upon retirement, members are assumed to pick the BackDROP period that when combined with the remaining annuity produces the highest liability.

The probabilities of disability for members eligible to retire are shown on Table X. The rates for disability were first used in the June 30, 2023 valuation.

The probabilities of withdrawal from service, death-in-service and disability are shown for sample ages on Table XI. The death-in-service and disability rates were first used in the June 30, 2023 valuation. The withdrawal rates were first used in the June 30, 2023 valuation.

The data about persons now covered and about present assets was furnished by the System's administrative staff. Although examined for general reasonableness, the data was not audited by the Actuary. Data was furnished as of May 31 and assumed to be statistically equivalent to June 30.

The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (MAAA).

Probabilities of Separation From Active Employment
Less Than 5 Years of Service

	MoDOT, Civilian Patrol, and MPERS		Uniformed Patrol	
Service	Male	Female	Male	Female
0 – 1	28.00%	22.00%	10.00%	10.00%
1 – 2	18.50%	15.00%	6.00%	6.00%
2 – 3	12.50%	14.00%	3.25%	3.25%
3 – 4	9.00%	12.00%	3.00%	3.00%
4 – 5	8.00%	7.00%	2.75%	2.75%

Probabilities of Separation From Active Employment
More Than 5 Years of Service

	MoDOT, Civilian Patrol, and MPERS		Uniformed Patrol	
Age	Male	Female	Male	Female
25	9.04%	10.40%	3.51%	3.51%
30	8.05%	9.43%	3.51%	3.51%
35	6.48%	7.49%	2.49%	2.49%
40	5.04%	5.73%	1.47%	1.47%
45	3.78%	4.63%	1.02%	1.02%
50	2.76%	3.94%	0.59%	0.59%
55	2.02%	3.71%	0.30%	0.30%
60	1.64%	3.71%	0.22%	0.22%

Salary Increase Assumptions
Service Based Salary Scale
% Merit Increases in Salaries Next Year

Service Index	MoDOT, Civilian Patrol, and MPERS Rate	Uniformed Patrol Rate
1	7.50 %	6.00%
2	3.80%	4.00%
3	2.80%	3.00%
4	1.50%	2.00%
5	1.00%	2.00%
6	0.80%	1.90%
7	0.00%	1.80%
8	0.00%	1.70%
9	0.00%	1.60%
10	0.00%	1.50%
11	0.00%	1.40%
12	0.00%	1.30%
13	0.00%	1.20%
14	0.00%	1.10%
15	0.00%	1.00%
16	0.00%	0.90%
17	0.00%	0.85%
18	0.00%	0.70%
19	0.00%	0.60%
20	0.00%	0.50%
21	0.00%	0.00%
22	0.00%	0.00%
23	0.00%	0.00%
24	0.00%	0.00%
25	0.00%	0.00%

Joint Life Retirement Values
(6.50% Interest)

Non-Uniformed

Sample Attained Ages	Present Value of $1 Monthly for Life		Percent Dying Next Year		Future Life Expectancy (years)	
	Men	Women	Men	Women	Men	Women
50	$155.47	$164.57	0.6520%	0.3833%	32.62	37.02
55	147.73	157.98	0.8254%	0.4642%	28.27	32.35
60	138.27	149.42	1.0655%	0.5519%	24.07	27.75
65	126.50	138.16	1.2627%	0.6616%	19.98	23.19
70	111.76	123.74	1.8506%	1.0405%	16.01	18.75
75	94.90	106.60	2.9586%	1.8224%	12.37	14.60
80	76.89	87.55	5.0640%	3.3335%	9.18	10.89

Uniformed

Sample Attained Ages	Present Value of $1 Monthly for Life		Percent Dying Next Year		Future Life Expectancy (years)	
	Men	Women	Men	Women	Men	Women
50	$163.07	$166.54	0.1899%	0.1360%	34.92	37.38
55	154.16	158.50	0.3066%	0.2548%	29.91	32.31
60	142.95	148.56	0.5466%	0.4618%	25.08	27.44
65	129.55	136.60	0.9302%	0.7330%	20.53	22.82
70	113.85	122.18	1.5214%	1.1630%	16.30	18.45
75	95.94	105.29	2.6293%	2.0127%	12.45	14.40
80	76.77	86.87	4.7848%	3.6106%	9.09	10.82

The present values shown above are for illustrative purposes only. They are straight life amounts and do not include the value of future post-retirement increases.

Percent of Eligible Active Members Retiring Next Year
(Rates of Retirement)

Closed and Year 2000 Plans

	MoDOT, Civilian Patrol, and MPERS				Uniformed Patrol
	Male		Female		
Age	**Normal**	**Early**	**Normal**	**Early**	**Normal**
50	39.00%	0.00%	25.00%	0.00%	45.00%
55	25.00%	3.00%	28.00%	3.00%	26.00%
60	21.00%	5.00%	23.00%	5.00%	100.00%
65	30.00%	0.00%	39.00%	0.00%	100.00%
70	40.00%	0.00%	50.00%	0.00%	100.00%

Year 2000 – 2011 Tier

	MoDOT, Civilian Patrol, and MPERS			Uniformed Patrol
	Normal			Normal
Age	**Age & Service**	**Rule of 90**	**Early**	
55	0.00%	30.00%	0.00%	30.00%
60	0.00%	30.00%	0.00%	100.00%
65	0.00%	30.00%	10.00%	100.00%
70	100.00%	100.00%	0.00%	100.00%

Percent of Members Becoming Disabled at the Indicated Age
(Rates of Disability)

	MoDOT, Civilian Patrol, and MPERS		Uniformed Patrol	
Age	**Male**	**Female**	**Male**	**Female**
25	0.08%	0.08%	0.10%	0.10%
30	0.09%	0.09%	0.10%	0.10%
35	0.12%	0.12%	0.10%	0.10%
40	0.16%	0.16%	0.10%	0.10%
45	0.26%	0.26%	0.10%	0.10%
50	0.43%	0.43%	0.10%	0.10%
55	0.82%	0.82%	0.10%	0.10%
60	1.41%	1.41%	0.10%	0.10%

Schedule of Funding Progress

Year Ending June 30	Actuarial Asset Value	Entry Age Accrued Liability	Unfunded Accrued Liability	Funded Ratio	Actuarial Covered Payroll[1]	UAAL as a Percentage of Covered Payroll
2014	$1,795,264,291	$3,650,241,741	$1,854,977,450	49.18%	$336,590,797	551.11%
2015	1,967,001,509	3,715,845,651	1,748,844,142	52.94%	342,264,593	510.96%
2016	2,086,654,348	3,761,733,004	1,675,078,656	55.47%	344,275,147	486.55%
2017	2,172,787,144	3,802,443,730	1,629,656,586	57.14%	356,142,973	457.58%
2018[2]	2,274,248,122	3,981,838,941	1,707,590,819	57.12%	353,371,000	483.23%
2019	2,415,343,431	4,037,369,708	1,622,026,277	59.82%	362,356,771	447.63%
2020	2,481,329,531	4,092,097,897	1,610,768,366	60.64%	363,572,158	443.04%
2021[2]	2,711,272,503	4,344,072,912	1,632,800,409	62.41%	358,987,667	454.83%
2022	2,925,561,398	4,410,685,047	1,485,123,649	66.33%	366,743,306	404.95%
2023[2]	3,247,983,333	4,709,391,407	1,461,408,074	68.97%	400,360,785	365.02%

(1) Values are estimated from contribution rate and amount.

(2) New assumptions and/or methods adopted.

See Note 5 of Notes to the Financial Statements in the Financial Section for funding policy information.

Member and Employer Contribution Rates

Year Ended June 30	Employer Contributions All Benefit Structures: Uniformed Patrol Group	Employer Contributions All Benefit Structures: Non-Uniformed Group	Member Contributions 2011 Tier All Groups
2014	55.23%	54.25%	4.00%
2015	58.19%	58.76%	4.00%
2016	57.76%	58.05%	4.00%
2017	58.00%	58.00%	4.00%
2018	58.00%	58.00%	4.00%
2019	58.00%	58.00%	4.00%
2020	58.00%	58.00%	4.00%
2021	58.00%	58.00%	4.00%
2022	58.00%	58.00%	4.00%
2023	58.65%	58.00%	4.00%

See Required Supplementary Information, Schedule of Employers' Contributions for more information.

	Non-Uniformed				
	Civilian Patrol	MoDOT and MPERS	Non-Uniformed Total	Uniformed Patrol	Grand Total
Active Members					
Closed Plan	159	860	1,019	295	1,314
Year 2000 Plan (Closed)	303	1,261	1,564	348	1,912
Year 2000 Plan – 2011 Tier (Open)	586	2,330	2,916	479	3,395
Total Active Members	1,048	4,451	5,499	1,122	6,621
Total Active Members Prior Year	*1,026*	*4,666*	*5,692*	*1,182*	*6,874*
Retiree – Regular Pensioners					
Closed Plan	479	3,074	3,553	1,128	4,681
Year 2000 Plan (Closed)	693	4,040	4,733	12	4,745
Year 2000 Plan – 2011 Tier (Open)	17	33	50	1	51
Total Regular Pensioners	1,189	7,147	8,336	1,141	9,477
Self Insured Disability Pensioners	1	36	37	3	40
Fully Insured Disability Pensioners	10	73	83	4	87
Terminated Vested Members	272	1,786	2,058	181	2,239
Total	**2,520**	**13,493**	**16,013**	**2,451**	**18,464**
Active Member Valuation Payroll	$55,285,348	$243,470,293	$298,755,641	$ 90,569,104	$ 389,324,745
Active Member Valuation Payroll Prior Year	*$49,500,683*	*$219,521,309*	*$269,021,992*	*$ 87,640,250*	*$ 356,662,242*
Unfunded Actuarial Accrued Liability	N/A	N/A	$989,773,506	$471,634,568	$1,461,408,074

Member data for actuarial valuation is as of May 31, 2023.

MoDOT and MPERS

Closed Plan

Attained Age	Counted by Complete Years of Service to Valuation Date 0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30+	Totals No.	Valuation Payroll
< 20	0	0	0	0	0	0	0	0	$ 0
20 – 24	0	0	0	0	0	0	0	0	0
25 – 29	0	0	0	0	0	0	0	0	0
30 – 34	0	0	0	0	0	0	0	0	0
35 – 39	0	0	0	0	0	0	0	0	0
40 – 44	0	0	1	2	22	1	0	26	1,463,456
45 – 49	0	0	2	1	108	63	2	176	12,147,936
50 – 54	0	1	3	3	63	183	50	303	21,671,271
55 – 59	0	0	3	6	57	71	76	213	14,391,976
60 – 64	2	0	2	1	20	40	50	115	7,381,369
65 – 69	0	0	0	0	4	11	7	22	1,403,565
70+	0	0	0	0	1	1	3	5	440,049
Totals	**2**	**1**	**11**	**13**	**275**	**370**	**188**	**860**	**$ 58,899,622**

Average Age	**53.8 years**
Average Service	**27.3 years**
Average Pay	**$68,488**

Year 2000 Plan

Attained Age	Counted by Complete Years of Service to Valuation Date 0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30+	Totals No.	Valuation Payroll
< 20	0	0	0	0	0	0	0	0	$ 0
20 – 24	0	0	0	0	0	0	0	0	0
25 – 29	0	0	0	0	0	0	0	0	0
30 – 34	1	1	7	0	0	0	0	9	426,404
35 – 39	5	9	49	71	0	0	0	134	7,826,681
40 – 44	10	6	42	155	66	0	0	279	17,087,061
45 – 49	8	12	40	96	93	0	0	249	15,105,099
50 – 54	11	12	36	107	69	2	0	237	13,641,791
55 – 59	3	4	24	81	67	0	0	179	9,853,317
60 – 64	2	5	23	66	34	1	0	131	6,940,946
65 – 69	0	0	10	24	5	0	0	39	2,058,771
70+	0	0	0	2	2	0	0	4	208,811
Totals	**40**	**49**	**231**	**602**	**336**	**3**	**0**	**1,261**	**$ 73,148,881**

Average Age	**49.3 years**
Average Service	**17.1 years**
Average Pay	**$58,009**

Member data for actuarial valuation is as of May 31, 2023.

MoDOT and MPERS

Year 2000 Plan – 2011 Tier

	Counted by Complete Years of Service to Valuation Date							Totals	
Attained Age	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30+	No.	Valuation Payroll
< 20	6	0	0	0	0	0	0	6	$ 224,752
20 – 24	153	2	0	0	0	0	0	155	6,419,511
25 – 29	274	92	0	0	0	0	0	366	18,156,469
30 – 34	199	186	13	0	0	0	0	398	20,077,074
35 – 39	165	142	35	0	0	0	0	342	16,606,822
40 – 44	143	110	24	0	0	0	0	277	13,011,802
45 – 49	105	81	8	0	0	0	0	194	9,396,393
50 – 54	128	89	11	0	0	0	0	228	10,668,024
55 – 59	95	86	18	0	1	0	0	200	9,449,759
60 – 64	60	66	15	0	0	0	0	141	6,380,689
65 – 69	8	10	3	0	0	0	0	21	939,354
70+	1	1	0	0	0	0	0	2	91,140
Totals	**1,337**	**865**	**127**	**0**	**1**	**0**	**0**	**2,330**	**$111,421,789**

Average Age	**40.0 years**
Average Service	**4.7 years**
Average Pay	**$47,821**

Member data for actuarial valuation is as of May 31, 2023.

Uniformed Patrol

Closed Plan

Attained Age	Counted by Complete Years of Service to Valuation Date 0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30+	Totals No.	Valuation Payroll
< 20	0	0	0	0	0	0	0	0	$ 0
20 – 24	0	0	0	0	0	0	0	0	0
25 – 29	0	0	0	0	0	0	0	0	0
30 – 34	0	0	0	0	0	0	0	0	0
35 – 39	0	0	0	0	0	0	0	0	0
40 – 44	0	0	1	0	2	0	0	3	243,551
45 – 49	0	0	0	0	25	45	0	70	6,724,505
50 – 54	0	0	0	1	13	129	24	167	16,212,928
55 – 59	1	0	0	0	1	29	23	54	5,241,727
60 – 64	0	0	0	0	0	1	0	1	85,739
65 – 69	0	0	0	0	0	0	0	0	0
70+	0	0	0	0	0	0	0	0	0
Totals	**1**	**0**	**1**	**1**	**41**	**204**	**47**	**295**	**$ 28,508,450**

Average Age	**51.7 years**
Average Service	**27.5 years**
Average Pay	**$96,639**

Year 2000 Plan

Attained Age	Counted by Complete Years of Service to Valuation Date 0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30+	Totals No.	Valuation Payroll
< 20	0	0	0	0	0	0	0	0	$ 0
20 – 24	0	0	0	0	0	0	0	0	0
25 – 29	0	0	0	0	0	0	0	0	0
30 – 34	0	0	3	0	0	0	0	3	256,893
35 – 39	0	0	46	41	0	0	0	87	7,303,820
40 – 44	0	0	14	86	24	0	0	124	11,111,148
45 – 49	1	0	7	23	58	0	0	89	8,064,024
50 – 54	0	0	4	12	20	1	0	37	3,294,351
55 – 59	0	0	0	5	3	0	0	8	676,327
60 – 64	0	0	0	0	0	0	0	0	0
65 – 69	0	0	0	0	0	0	0	0	0
70+	0	0	0	0	0	0	0	0	0
Totals	**1**	**0**	**74**	**167**	**105**	**1**	**0**	**348**	**$ 30,706,563**

Average Age	**43.3 years**
Average Service	**17.7 years**
Average Pay	**$88,237**

Member data for actuarial valuation is as of May 31, 2023.

Uniformed Patrol

Year 2000 Plan – 2011 Tier

Attained Age	Counted by Complete Years of Service to Valuation Date 0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30+	Totals No.	Valuation Payroll
< 20	0	0	0	0	0	0	0	0	$ 0
20 – 24	40	0	0	0	0	0	0	40	2,499,689
25 – 29	116	34	0	0	0	0	0	150	9,399,878
30 – 34	53	87	31	0	0	0	0	171	11,211,182
35 – 39	18	28	41	0	0	0	0	87	6,092,683
40 – 44	0	9	10	0	0	0	0	19	1,330,293
45 – 49	0	3	4	0	0	0	0	7	484,852
50 – 54	1	1	2	0	0	0	0	4	267,567
55 – 59	0	0	1	0	0	0	0	1	67,946
60 – 64	0	0	0	0	0	0	0	0	0
65 – 69	0	0	0	0	0	0	0	0	0
70+	0	0	0	0	0	0	0	0	0
Totals	**228**	**162**	**89**	**0**	**0**	**0**	**0**	**479**	**$ 31,354,090**

Average Age	**31.4 years**
Average Service	**6.0 years**
Average Pay	**$65,457**

Member data for actuarial valuation is as of May 31, 2023.

Civilian Patrol

Closed Plan

Attained Age	Counted by Complete Years of Service to Valuation Date 0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30+	Totals No.	Valuation Payroll
< 20	0	0	0	0	0	0	0	0	$ 0
20 – 24	0	0	0	0	0	0	0	0	0
25 – 29	0	0	0	0	0	0	0	0	0
30 – 34	0	0	0	0	0	0	0	0	0
35 – 39	0	0	0	0	0	0	0	0	0
40 – 44	0	1	0	0	3	2	0	6	293,422
45 – 49	0	0	0	0	13	16	0	29	1,859,879
50 – 54	0	0	2	1	9	27	6	45	2,682,029
55 – 59	0	0	3	1	7	20	15	46	2,929,963
60 – 64	0	0	3	0	6	10	6	25	1,406,581
65 – 69	0	0	0	0	3	3	1	7	382,505
70+	0	0	0	0	0	0	1	1	41,838
Totals	**0**	**1**	**8**	**2**	**41**	**78**	**29**	**159**	**$ 9,596,217**

Average Age	**54.5 years**
Average Service	**26.9 years**
Average Pay	**$60,354**

Year 2000 Plan

Attained Age	Counted by Complete Years of Service to Valuation Date 0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30+	Totals No.	Valuation Payroll
< 20	0	0	0	0	0	0	0	0	$ 0
20 – 24	0	0	0	0	0	0	0	0	0
25 – 29	0	0	0	0	0	0	0	0	0
30 – 34	0	1	2	0	0	0	0	3	159,806
35 – 39	1	1	25	11	1	0	0	39	2,309,814
40 – 44	0	4	11	43	17	0	0	75	4,868,920
45 – 49	1	4	8	27	15	0	0	55	3,487,225
50 – 54	1	2	11	20	16	0	0	50	2,866,206
55 – 59	0	4	8	26	16	0	0	54	2,947,222
60 – 64	0	1	6	9	8	0	0	24	1,348,322
65 – 69	0	0	1	1	1	0	0	3	130,092
70+	0	0	0	0	0	0	0	0	0
Totals	**3**	**17**	**72**	**137**	**74**	**0**	**0**	**303**	**$ 18,117,607**

Average Age	**48.4 years**
Average Service	**16.9 years**
Average Pay	**$59,794**

Member data for actuarial valuation is as of May 31, 2023.

Civilian Patrol

Year 2000 Plan – 2011 Tier

Attained Age	Counted by Complete Years of Service to Valuation Date: 0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30+	Totals: No.	Valuation Payroll
< 20	0	0	0	0	0	0	0	0	$ 0
20 – 24	37	0	0	0	0	0	0	37	1,389,752
25 – 29	81	22	0	0	0	0	0	103	4,855,920
30 – 34	51	57	9	0	0	0	0	117	6,092,472
35 – 39	20	30	21	0	0	0	0	71	3,670,802
40 – 44	21	26	6	0	0	0	0	53	2,497,661
45 – 49	20	17	9	0	0	0	0	46	2,306,449
50 – 54	28	23	5	0	0	0	0	56	2,395,582
55 – 59	23	21	7	0	0	0	0	51	2,299,060
60 – 64	20	14	3	0	0	0	0	37	1,430,353
65 – 69	4	7	3	0	0	0	0	14	584,104
70+	0	0	1	0	0	0	0	1	49,368
Totals	**305**	**217**	**64**	**0**	**0**	**0**	**0**	**586**	**$ 27,571,523**

Average Age	**40.8 years**
Average Service	**5.0 years**
Average Pay	**$47,050**

Member data for actuarial valuation is as of May 31, 2023.

Actuarial Valuation for June 30	Number of Participating Employers	Number of Active Members	Covered Payroll	Average Pay	Percent Change in Average Pay from Prior Year
2014	3	7,390	$332,085,689	$44,937	1.8%
2015	3	7,358	334,400,980	45,447	1.1
2016	3	7,441	339,799,379	45,666	0.5
2017	3	7,456	348,979,212	46,805	2.5
2018	3	7,391	351,496,555	47,557	1.6
2019	3	7,421	359,296,056	48,416	1.8
2020	3	7,355	360,851,545	49,062	1.3
2021	3	7,219	355,194,571	49,203	0.3
2022	3	6,874	356,662,243	51,886	5.5
2023	3	6,621	389,324,744	58,802	13.3
				Ten-Year Average	**3.0%**

Member data for actuarial valuation is as of May 31, 2023.

The MPERS funding objective is to meet long-term benefit promises through contributions that remain approximately level from year to year as a percent of member payroll. If the contributions to the System are level in concept and soundly executed, the System will pay all promised benefits when due – the ultimate test of financial soundness.

A solvency test is one means of checking a system's progress under its funding program. In a solvency test for a non-contributory plan, the plan's present assets (cash and investments) are compared with: 1) The liabilities for future benefits to present retired lives and 2) The liabilities for service already rendered by members. In a system that has been following the discipline of level percent-of-payroll financing, the liabilities for future benefits to present retired lives (liability 1) will be fully covered by present assets (except in rare circumstances). In addition, the liabilities for service already rendered by members (liability 2) will be partially covered by the remainder of present assets. The larger the funded portion of liability 2, the stronger the condition of the system.

The schedule below illustrates the history of liability 2 of the System.

Valuation Date June 30	(1) Member Contributions	(2) Retirees and Beneficiaries	(3) Active and Inactive Members	Present Valuation Assets	Portion of Present Values Covered by Present Assets			
	Millions				(1)	(2)	(3)	Total
2014	$ 2	$ 2,384	$1,264	$1,795	100%	75%	0%	49%
2015	3	2,444	1,269	1,967	100%	80%	0%	53%
2016	5	2,470	1,287	2,087	100%	84%	0%	55%
2017	8	2,488	1,306	2,173	100%	87%	0%	57%
2018*	11	2,598	1,373	2,274	100%	87%	0%	57%
2019	14	2,656	1,367	2,415	100%	90%	0%	60%
2020	18	2,726	1,348	2,481	100%	90%	0%	61%
2021*	21	2,882	1,441	2,711	100%	93%	0%	62%
2022	24	2,952	1,435	2,926	100%	98%	0%	66%
2023*	29	3,120	1,560	3,248	100%	100%	6%	69%

**New Assumptions and/or methods.*

Actual experience will never coincide exactly with assumed experience (except by coincidence). Gains and losses may offset each other over a period of years, but sizeable year-to-year variations from assumed experience are common. Detail on the derivation of the experience gain (loss) is shown below.

UAAL Beginning of Year (at July 1)	$1,485,123,649
Normal Cost	53,219,149
Transfer In and Service Purchase – Liability	4,610,022
Contributions	(244,262,169)
Interest	90,473,965
Net Change in LTD Assets	0
Expected UAAL Before Any Changes	1,389,164,616
Effect of Benefit Changes	0
Effect of Changes of Assumptions and Methods	44,379,018
Effect of Adjustment	0
Expected UAAL After Changes	1,433,543,634
End of Year UAAL (at June 30)	$1,461,408,074
Gain/(Loss) for Year	$ (27,864,440)
Gain/(Loss) as a percent of actuarial accrued liabilities at start of year ($4,410.7 million)	(0.6)%

Valuation Date June 30	Experience Gain (Loss) as % of Beginning Accrued Liability
2014	2.1%
2015	2.4%
2016	1.1%
2017	0.1%
2018	0.6%
2019	0.7%
2020	(1.2)%
2021	3.6%
2022	1.9%
2023	(0.6)%

	Added to Rolls		Removed from Rolls		Rolls End of Year			% Increase	
Valuation Date	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances	Average Annual Allowances	Annual Allowance	Average Annual Allowance
FY2023									
Retirees	392	$5,767,290	239	$3,459,294	7,597	$218,727,201	$28,791	4.52%	2.42%
Beneficiaries	146	1,650,536	138	1,500,200	1,926	42,033,928	21,824	4.13%	3.69%
Disabilities	18	0	15	0	127	847,936	6,625	3.04%	-1.78%
FY2022									
Retirees	430	$5,592,522	240	$4,287,730	7,444	$209,268,115	$28,112	1.67%	-0.93%
Beneficiaries	136	1,815,705	127	1,538,452	1,918	40,367,666	21,047	4.03%	3.55%
Disabilities	18	0	22	12,610	124	822,885	6,745	-2.42%	2.38%
FY2021									
Retirees	335	$4,388,320	289	$4,630,165	7,254	$205,830,949	$28,375	1.21%	0.57%
Beneficiaries	161	2,092,581	131	1,421,420	1,909	38,802,739	20,326	4.31%	2.67%
Disabilities	14	0	25	6,652	128	843,262	6,588	0.46%	9.09%
FY2020									
Retirees	339	$4,389,004	204	$ 360,775	7,208	$203,365,258	$28,214	2.39%	0.53%
Beneficiaries	129	1,441,941	122	1,316,530	1,879	37,200,605	19,798	3.35%	2.64%
Disabilities	7	0	26	750	139	839,398	6,039	-1.93%	0.89%
FY2019									
Retirees	308	$4,104,217	187	$2,746,320	7,077	$198,618,027	$28,065	2.54%	0.78%
Beneficiaries	133	1,424,022	130	1,211,576	1,866	35,993,556	19,289	3.04%	2.87%
Disabilities	22	0	27	31,787	143	855,947	5,986	1.26%	4.80%
FY2018									
Retirees	311	$3,842,195	201	$2,780,558	6,956	$193,705,411	$27,847	1.96%	0.34%
Beneficiaries	112	1,103,494	124	855,794	1,863	34,930,984	18,750	1.97%	2.62%
Disabilities	18	0	25	26,921	148	845,327	5,712	-2.82%	2.44%
FY2017									
Retirees	352	$4,642,501	196	$3,023,457	6,846	$189,990,373	$27,752	1.29%	-1.02%
Beneficiaries	127	1,536,955	134	1,099,249	1,875	34,257,599	18,271	3.49%	3.88%
Disabilities	24	0	24	15,898	155	869,833	5,576	-3.92%	-4.54%
FY2016									
Retirees	300	$3,820,071	193	$3,032,208	6,690	$187,571,039	$28,038	2.31%	0.68%
Beneficiaries	129	1,205,294	121	889,494	1,882	33,100,896	17,588	3.18%	2.74%
Disabilities	20	0	29	5,787	155	905,306	5,841	0.21%	6.05%
FY2015									
Retirees	406	$4,669,565	188	$2,712,395	6,583	$183,337,549	$27,850	2.61%	-0.79%
Beneficiaries	113	1,290,336	139	900,991	1,874	32,080,172	17,119	2.65%	4.07%
Disabilities	21	0	30	22,387	164	903,386	5,508	-3.43%	1.87%
FY2014									
Retirees	307	$4,434,888	176	$2,317,420	6,365	$178,670,075	$28,071	3.54%	1.41%
Beneficiaries	112	1,163,441	126	863,108	1,900	31,253,184	16,449	3.91%	4.68%
Disabilities	19	6,760	25	19,831	173	935,492	5,407	3.41%	6.40%

New disabilities are covered/paid by The Standard Insurance Co.
Data of this chart is as of June 30, 2023.

Comparison of the Closed Plan, the Year 2000 Plan, and the Year 2000 Plan – 2011 Tier

For the Year Ended June 30, 2023

Plan Provision	Closed Plan	Year 2000 Plan	Year 2000 Plan - 2011 Tier
Membership Eligibility	• Members hired prior to July 1, 2000, who became vested, and worked or continue to work in a position normally requiring at least 1,040 hours of work annually.	• Members hired for the first time on or after July 1, 2000, in a position normally requiring at least 1,040 hours of work annually. • Members who left state employment prior to becoming vested and return to work (for 12 continuous months) on or after July 1, 2000, in a position normally requiring at least 1,040 hours of work annually.	• Members hired for the first time on or after January 1, 2011, in a position normally requiring at least 1,040 hours of work annually.
Normal Retirement Eligibility	• Age 65 & active with 4 years of service. • Age 65 with 5 years of service. • Age 60 with 15 years of service. • “Rule of 80”/minimum age 48. Uniformed Members Only: • Age 55 & active with 4 years of service. • Age 55 with 5 years of service. • Mandatory retirement at age 60; no minimum service requirement (active only).	• Age 62 with 5 years of service. • “Rule of 80” / minimum age 48 (active only). Uniformed Members Only: • Mandatory retirement at age 60; no minimum service requirement (active only).	• Age 67 with 5 years of service. • “Rule of 90” / minimum age 55 (active only). Uniformed Members Only: • Age 55 & active with 5 years of service (active only). • Mandatory retirement at age 60; no minimum service requirement (active only).
Early (Reduced) Retirement Eligibility	• Age 55 with 10 years of creditable service.	• Age 57 with 5 years of creditable service.	• Age 62 with 5 years of creditable service (active only).
Life Benefit	1.6% x FAP** x service (base benefit is increased by 33⅓% for uniformed patrol members only).	1.7% x FAP** x service	1.7% x FAP** x service
Temporary Benefit	Not available.	0.8% x FAP** x service Until age 62, only if retiring under “Rule of 80”.	0.8% x FAP** x service Until age 62, only if retiring under “Rule of 90”.
Special Benefit	Uniformed Members Only: $90/mo payable until age 65, offset by any amount earned from gainful employment (does not apply if hired on or after January 1, 1995).	Uniformed Members Only: Until age 62, if retiring under “Rule of 80” or at mandatory age 60.	Uniformed Members Only: Until age 62, if retiring under either normal retirement eligibility provision.
Death Benefit	$5,000 benefit paid to named beneficiary • Available to active employees or LTD recipients who retired after September 28, 1985. • Available to work-related disability recipients after September 28, 1985.	$5,000 benefit paid to named beneficiary • Available to active employees or LTD recipients who retire. • Available to work-related disability recipients.	$5,000 benefit paid to named beneficiary • Available to active employees or LTD recipients who retire. • Available to work-related disability recipients.

Comparison of the Closed Plan, the Year 2000 Plan, and the Year 2000 Plan – 2011 Tier
For the Year Ended June 30, 2023 (continued)

Plan Provision	Closed Plan	Year 2000 Plan	Year 2000 Plan - 2011 Tier
Vesting	5 years of service.	5 years of service.	5 years of service, if active on or after January 1, 2018.
Cost-of-Living Allowance (COLA)	Annual COLA is equal to 80% of the change in the CPI-U with a maximum rate of 5%. Exception: If hired before August 28, 1997, annual COLA is a minimum of 4% until benefit increases reach 65% of the original benefit (cap). After 65% cap is reached, annual COLA will be equal to 80% of the change in the CPI-U, with a maximum rate of 5%.	Annual COLA is equal to 80% of the change in the CPI-U with a maximum rate of 5%.	Annual COLA is equal to 80% of the change in the CPI-U with a maximum rate of 5%.
Survivor Benefit (death before retirement) Non Duty-Related Death	If employee is vested: • Survivor benefit to eligible spouse calculated using the joint & 100% survivor option or 80% of the member's life income annuity paid to eligible children under age 21. • If at least 3, but less than 5, years of service, the survivor benefit is calculated using 25% of the member's base benefit calculated as if the member retired on his/her date of death.	If employee is vested: • Survivor benefit to eligible spouse calculated using the joint & 100% survivor option or 80% of the member's life income annuity paid to eligible children under age 21.	If employee is vested: • Survivor benefit to eligible spouse calculated using the joint & 100% survivor option or 80% of the member's life income annuity paid to eligible children under age 21.
Duty-Related Death	• Survivor benefit to eligible spouse or children no less than 50% of final average pay (no minimum service requirement).	• Survivor benefit to eligible spouse or children no less than 50% of final average pay (no minimum service requirement).	• Survivor benefit to eligible spouse or children no less than 50% of final average pay (no minimum service requirement).
Optional Forms of Payment	Payment options include: • Life income annuity • Unreduced joint & 50% survivor • Joint & 100% survivor • 60 or 120 guaranteed payments • BackDROP	Payment options include: • Life income annuity • Joint & 50% survivor • Joint & 100% survivor • 120 or 180 guaranteed payments • BackDROP	Payment options include: • Life income annuity • Joint & 50% survivor • Joint & 100% survivor • 120 or 180 guaranteed payments
Disability	Long-term disability and work-related disability.	Long-term disability and work-related disability.	Long-term disability and work-related disability.
Employee Contributions	Non-contributory.	Non-contributory.	4% of gross pay.

**This summary describes the plan provisions in chapter 104 of the Missouri Revised Statutes. It does not overrule any other applicable statue or administrative rule and, in the event of a conflict, the applicable statue or rule would apply. The Year 2000 Plan was effective July 1, 2000 and the Year 2000 Plan – 2011 Tier was effective January 1, 2011. A complete summary is available at the MPERS office.*

***Final Average Pay (FAP) – Average of highest 36 consecutive months of pay.*

See note 2 of Notes to the Financial Statements for more information.

For the fiscal year ended June 30, 2023, no legislation became effective. There were two bills passed during this period that will become effective August 28, 2023. Senate Bills 20 and 75 were Truly Agreed and Passed and signed into law by Governor Parson. In summary, as it relates to MPERS, these bills included an update that staggered the terms of elected trustees to the MPERS Board in order to mitigate the chances of all elected trustees turning over at the same time. Furthermore, these bills included a myriad of updates to existing statutory sections that clarified and/or corrected provisions that will allow System staff to better implement the laws applicable to the retirement system. Nothing in the cleanup provisions affected the benefits of MPERS' members.

MSHP, MoDOT, and MPERS
Security for a lifetime...together.

Statistical Section

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Financial Information

The chart on page 86 details a 10-year history of the additions (revenues) and deductions (expenses) of MPERS.

The chart on page 87 details a 10-year history of benefit payments by type.

Plan Membership

Overall, MPERS' membership decreased by 82. Retired members and their beneficiaries increased by 164, terminated-vested members decreased by 12, and active members decreased by 234.

Other charts and graphs in this section detail demographic information concerning our members and employers.

Sources: All non-accounting data in this section was derived from internal sources as of June 30, and the annual actuarial valuation reports. Member data may differ between some schedules because the valuations are performed using data as of May 31 each year.

MoDOT and Patrol Employee's Retirement System
Changes in Net Position, Last Ten Fiscal Years

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Additions										
Employer Contributions	$183,353,841	$200,638,571	$199,609,396	$206,562,924	$204,955,180	$210,166,927	$210,871,852	$208,212,848	$212,711,117	$232,813,995
Employee Contributions	1,282,379	2,086,000	2,503,824	3,238,502	3,721,983	4,449,428	4,983,989	5,334,102	5,899,734	6,838,152
Transfers from Other System	1,784,382	1,114,437	2,729,679	1,752,050	1,867,445	2,432,370	3,483,574	2,080,317	4,334,202	4,036,789
Other Contributions	978,184	1,208,162	978,689	1,645,487	1,279,434	1,546,916	1,563,362	1,761,860	2,421,844	573,233
Net Investment Income	319,445,655	92,645,423	21,432,090	220,301,127	197,619,367	154,326,511	(10,673,270)	699,644,251	122,767,485	264,756,429
Other Income	125	148	5	614	472	307	5,412	286	195	1,954
Total Additions to Fiduciary Net Position	$506,844,566	$297,692,741	$227,253,683	$433,500,704	$409,443,881	$372,922,459	$210,234,919	$917,033,664	$348,134,577	$509,020,552
Deductions										
Benefit Payments	$231,384,708	$241,714,876	$240,176,011	$251,284,152	$ 259,058,863	$259,817,811	$267,605,833	$270,122,851	$279,637,701	$289,056,536
Administrative Expenses	3,736,355	4,066,944	4,370,860	4,515,458	4,693,492	4,372,966	4,291,028	4,585,473	5,229,018	5,529,258
Total Deductions from Fiduciary Net Position	$235,121,063	$245,781,820	$244,546,871	$255,799,610	$263,752,355	$264,190,777	$271,896,861	$274,708,324	$284,866,719	$294,585,794
Change in Net Position	**$271,723,503**	**$ 51,910,921**	**$(17,293,188)**	**$177,701,094**	**$145,691,526**	**$108,731,682**	**$(61,661,942)**	**$642,325,340**	**$ 63,267,858**	**$214,434,758**

MoDOT and Patrol Employees' Retirement System
Benefit Payments by Type, Last Ten Fiscal Years

Type of Benefit	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Age and Service Benefits:										
Retiree and Survivor Annuity Payments	$212,840,210	$218,827,986	$224,098,038	$227,997,513	$237,850,981	$238,205,549	$245,194,376	$250,420,018	$254,733,514	$265,534,764
BackDROP Payments	13,438,730	16,366,338	10,677,166	16,887,349	14,546,108	15,424,880	15,787,033	13,585,357	17,688,088	15,605,731
Disability Benefits:										
Long-Term Disability	79,184	76,061	66,389	60,352	49,613	35,987	26,488	21,023	14,370	8,884
Work-Related Disability	774,541	716,047	718,009	707,953	714,197	711,990	698,794	710,841	719,345	741,568
Normal Disability	121,872	108,891	109,027	109,455	110,310	112,000	114,119	115,952	100,068	94,927
Insured Disability	1,531,578	1,554,676	1,567,825	1,620,418	1,601,605	1,615,860	1,640,971	1,600,628	1,470,000	1,715,791
Death Benefits	703,571	810,000	820,000	855,153	860,000	820,000	890,000	1,255,000	1,130,000	1,065,000
Service Transfer Payments (1)	1,876,336	3,147,482	1,921,451	2,724,631	2,823,042	2,111,007	2,457,945	1,802,900	2,757,330	3,317,630
Employee Contribution Refunds	18,686	107,395	198,106	321,328	503,007	780,538	796,107	611,132	1,024,986	972,241
Total Benefits	**$231,384,708**	**$241,714,876**	**$240,176,011**	**$251,284,152**	**$259,058,863**	**$259,817,811**	**$267,605,833**	**$270,122,851**	**$279,637,701**	**$289,056,536**

(1) Reciprocal transfer legislation enacted effective August 28, 2011.

MoDOT and Patrol Employees' Retirement System
Budget to Actual Report
As of June 30, 2023

	Annual Budget	Actual: Year End	Actual: % Spent	Budget Variance Favorable / (Unfavorable)
Administrative Expenses				
Salary/Benefits	$2,301,104	$2,284,035	99.3%	$ 17,069
Professional Services	377,925	334,369	88.5%	43,556
Meetings/Travel/Education	39,370	23,928	60.8%	15,442
Member Education	13,704	4,997	36.5%	8,707
Office Supplies	5,000	3,813	76.3%	1,187
Printing/Postage	31,400	26,643	84.9%	4,757
Membership Dues/Subscriptions	26,142	23,779	90.7%	2,363
Utilities	35,410	35,134	99.2%	276
Building Expense/Maintenance	41,710	41,513	99.5%	197
Equipment/Furniture	11,565	7,294	63.1%	4,271
Information Technology	316,074	329,395	104.2%	(13,321)
Total Administrative Expenses	$3,199,404	$3,114,900	97.4%	$ 84,504
Investment Expenses				
Salary/Benefits	$3,131,216	$2,247,141	71.8%	$884,075
Investment Services	685,000	677,185	98.9%	7,815
Meetings/Travel/Education	58,350	45,987	78.8%	12,363
Direct Operating Expenses	45,874	52,403	114.2%	(6,529)
Total Investment Expenses	$3,920,440	$3,022,716	77.1%	$897,724
TOTALS	**$7,119,844**	**$6,137,616**	**86.2%**	**$982,228**

Reconciliation to Statement of Changes in Fiduciary Net Position, Administrative Expenses:

Total Administrative Expenses	$5,529,258
Investment General Consultant	355,000
Investment Custodian	297,185
Actuarial Experience Study	37,400
Depreciation Expense	(23,751)
OPEB Expense	(81,143)
OPEB Deferred Outflow	23,667
	$6,137,616

All Members*

Amount of Monthly Benefit	Type of Benefit						Total Recipients
	Retirement		Disability				
	Normal	Early	Normal	Work-Related	Long-Term	Survivor	
$ 1 – 200	35	82	2	29	58	61	267
201 – 400	195	248	2	0	2	131	578
401 – 600	213	164	1	0	1	143	522
601 – 800	225	143	0	0	0	133	501
801 – 1,000	197	84	4	1	0	154	440
1,001 – 1,200	251	42	0	1	0	138	432
1,201 – 1,400	302	29	1	1	0	124	457
1,401 – 1,600	372	14	0	1	0	119	506
1,601 – 1,800	454	6	1	1	0	105	567
1,801 – 2,000	466	5	0	2	0	108	581
2,001 – 2,200	509	4	0	5	0	87	605
2,201 – 2,400	439	2	0	3	0	74	518
2,401 – 2,600	342	1	0	2	0	64	409
2,601 – 2,800	299	0	0	2	0	55	356
2,801 – 3,000	259	0	0	1	0	57	317
> 3,000	2,211	4	0	6	0	373	2,594
TOTALS	**6,769**	**828**	**11**	**55**	**61**	**1,926**	**9,650**

**This chart includes eleven retirement system staff retirees.*

MoDOT

Amount of Monthly Benefit	Type of Benefit						Total Recipients
	Retirement		Disability				
	Normal	Early	Normal	Work-Related	Long-Term	Survivor	
$ 1 – 200	29	62	2	26	47	56	222
201 – 400	142	209	2	0	2	110	465
401 – 600	157	125	1	0	1	123	407
601 – 800	158	120	0	0	0	116	394
801 – 1,000	141	74	4	1	0	130	350
1,001 – 1,200	194	38	0	1	0	122	355
1,201 – 1,400	232	20	1	1	0	115	369
1,401 – 1,600	305	12	0	1	0	111	429
1,601 – 1,800	382	5	1	1	0	87	476
1,801 – 2,000	385	5	0	2	0	91	483
2,001 – 2,200	433	4	0	5	0	77	519
2,201 – 2,400	385	2	0	2	0	59	448
2,401 – 2,600	300	1	0	2	0	50	353
2,601 – 2,800	258	0	0	0	0	34	292
2,801 – 3,000	226	0	0	1	0	37	264
> 3,000	1,207	3	0	5	0	241	1,456
TOTALS	**4,934**	**680**	**11**	**48**	**50**	**1,559**	**7,282**

Uniformed Patrol

Amount of Monthly Benefit	Type of Benefit: Retirement Normal	Retirement Early	Disability Normal	Disability Work-Related	Disability Long-Term	Survivor	Total Recipients
$ 1 – 200	0	0	0	2	2	0	4
201 – 400	7	1	0	0	0	4	12
401 – 600	13	0	0	0	0	3	16
601 – 800	22	0	0	0	0	4	26
801 – 1,000	16	0	0	0	0	3	19
1,001 – 1,200	8	0	0	0	0	5	13
1,201 – 1,400	9	0	0	0	0	1	10
1,401 – 1,600	4	0	0	0	0	1	5
1,601 – 1,800	3	0	0	0	0	6	9
1,801 – 2,000	1	0	0	0	0	6	7
2,001 – 2,200	5	0	0	0	0	5	10
2,201 – 2,400	2	0	0	1	0	9	12
2,401 – 2,600	3	0	0	0	0	10	13
2,601 – 2,800	5	0	0	1	0	16	22
2,801 – 3,000	1	0	0	0	0	17	18
> 3,000	831	0	0	1	0	126	958
TOTALS	**930**	**1**	**0**	**5**	**2**	**216**	**1,154**

Civilian Patrol

Amount of Monthly Benefit	Type of Benefit: Retirement Normal	Retirement Early	Disability Normal	Disability Work-Related	Disability Long-Term	Survivor	Total Recipients
$ 1 – 200	6	20	0	1	9	5	41
201 – 400	46	38	0	0	0	17	101
401 – 600	43	39	0	0	0	17	99
601 – 800	45	23	0	0	0	13	81
801 – 1,000	40	10	0	0	0	21	71
1,001 – 1,200	49	4	0	0	0	11	64
1,201 – 1,400	61	9	0	0	0	8	78
1,401 – 1,600	62	2	0	0	0	7	71
1,601 – 1,800	69	1	0	0	0	12	82
1,801 – 2,000	80	0	0	0	0	11	91
2,001 – 2,200	71	0	0	0	0	5	76
2,201 – 2,400	51	0	0	0	0	6	57
2,401 – 2,600	39	0	0	0	0	4	43
2,601 – 2,800	35	0	0	1	0	5	41
2,801 – 3,000	32	0	0	0	0	3	35
> 3,000	166	0	0	0	0	6	172
TOTALS	**895**	**146**	**0**	**2**	**9**	**151**	**1,203**

MoDOT

By Years of Service

Retired In Fiscal Year		0 – 10	11 – 15	16 – 20	21 – 25	26 – 30	31 – 35	36 – 40	41+
2014	Average Benefit	$ 342	$ 844	$1,421	$1,855	$2,968	$3,290	$3,357	$ 0
2014	Average FAP	$2,429	$3,171	$3,493	$3,874	$4,509	$4,606	$3,781	$ 0
2014	Current Retirees	26	21	19	40	75	14	2	0
2015	Average Benefit	$ 359	$ 707	$1,369	$1,827	$2,980	$3,771	$3,614	$ 0
2015	Average FAP	$2,660	$3,047	$3,409	$3,600	$4,324	$4,673	$4,286	$ 0
2015	Current Retirees	48	56	33	46	75	18	2	0
2016	Average Benefit	$ 354	$ 597	$1,011	$1,801	$3,105	$3,709	$4,809	$ 0
2016	Average FAP	$2,828	$2,710	$2,889	$3,754	$4,342	$4,709	$5,147	$ 0
2016	Current Retirees	30	23	24	45	77	13	2	0
2017	Average Benefit	$ 374	$ 636	$1,079	$1,798	$3,192	$4,156	$2,935	$ 0
2017	Average FAP	$2,568	$2,828	$3,087	$3,616	$4,613	$4,801	$3,717	$ 0
2017	Current Retirees	38	29	28	54	82	12	3	0
2018	Average Benefit	$ 345	$ 665	$1,134	$2,004	$3,125	$4,249	$3,410	$ 0
2018	Average FAP	$2,570	$3,009	$3,431	$3,971	$4,559	$4,957	$3,909	$ 0
2018	Current Retirees	31	33	36	46	69	10	1	0
2019	Average Benefit	$ 350	$ 715	$1,092	$1,916	$3,266	$3,563	$3,106	$ 0
2019	Average FAP	$2,617	$3,037	$3,444	$3,879	$4,727	$4,594	$4,015	$ 0
2019	Current Retirees	33	22	37	46	63	14	4	0
2020	Average Benefit	$ 354	$ 641	$1,165	$1,895	$3,221	$3,935	$3,533	$5,326
2020	Average FAP	$2,715	$3,118	$3,470	$3,799	$4,641	$4,890	$5,237	$5,540
2020	Current Retirees	28	26	33	58	88	7	3	2
2021	Average Benefit	$ 317	$ 789	$1,164	$1,856	$3,003	$3,430	$3,238	$3,117
2021	Average FAP	$2,881	$3,158	$3,453	$3,790	$4,342	$4,624	$4,677	$3,460
2021	Current Retirees	30	18	47	66	58	13	3	1
2022	Average Benefit	$ 314	$ 732	$1,148	$1,874	$3,068	$3,264	$3,133	$3,227
2022	Average FAP	$2,769	$3,420	$3,567	$3,771	$4,455	$4,622	$4,108	$3,993
2022	Current Retirees	45	37	47	72	72	16	3	2
2023	Average Benefit	$ 336	$ 655	$1,195	$2,049	$3,024	$3,970	$3,216	$ 0
2023	Average FAP	$2,928	$3,252	$3,812	$4,036	$4,768	$5,199	$4,353	$ 0
2023	Current Retirees	43	42	44	56	73	9	1	0

FAP = Final Average Pay

Uniformed Patrol

By Years of Service

Retired In Fiscal Year		0 – 10	11 – 15	16 – 20	21 – 25	26 – 30	31 – 35	36 – 40	41+
2014	Average Benefit	$ 593	$ 0	$ 0	$ 0	$6,261	$7,507	$ 0	$ 0
2014	Average FAP	$2,503	$ 0	$ 0	$ 0	$6,528	$6,649	$ 0	$ 0
2014	Current Retirees	5	0	0	0	24	10	0	0
2015	Average Benefit	$ 926	$1,028	$ 0	$4,654	$6,264	$7,659	$ 0	$ 0
2015	Average FAP	$3,119	$4,458	$ 0	$6,170	$6,680	$6,951	$ 0	$ 0
2015	Current Retirees	1	1	0	1	19	10	0	0
2016	Average Benefit	$ 321	$1,308	$ 0	$4,829	$5,743	$7,373	$ 0	$ 0
2016	Average FAP	$2,599	$3,804	$ 0	$6,405	$6,559	$7,039	$ 0	$ 0
2016	Current Retirees	1	1	0	4	12	4	0	0
2017	Average Benefit	$ 649	$1,253	$3,481	$4,785	$5,768	$9,098	$8,383	$ 0
2017	Average FAP	$2,791	$3,804	$5,548	$5,621	$6,786	$7,841	$7,077	$ 0
2017	Current Retirees	2	2	1	1	29	1	1	0
2018	Average Benefit	$ 451	$1,206	$1,740	$4,356	$5,603	$ 0	$ 0	$ 0
2018	Average FAP	$2,566	$3,430	$3,943	$7,001	$6,771	$ 0	$ 0	$ 0
2018	Current Retirees	2	3	1	4	25	0	0	0
2019	Average Benefit	$ 402	$1,213	$2,095	$3,778	$5,358	$6,762	$ 0	$ 0
2019	Average FAP	$2,748	$3,589	$4,417	$6,051	$6,930	$7,472	$ 0	$ 0
2019	Current Retirees	3	1	2	4	33	6	0	0
2020	Average Benefit	$ 602	$ 847	$2,504	$3,794	$5,208	$6,234	$ 0	$ 0
2020	Average FAP	$3,004	$3,047	$5,530	$6,246	$6,929	$6,915	$ 0	$ 0
2020	Current Retirees	5	1	3	5	25	4	0	0
2021	Average Benefit	$ 574	$ 0	$ 0	$3,390	$5,058	$6,003	$ 0	$ 0
2021	Average FAP	$3,261	$ 0	$ 0	$6,136	$6,984	$7,164	$ 0	$ 0
2021	Current Retirees	8	0	0	5	30	6	0	0
2022	Average Benefit	$ 633	$ 930	$2,485	$3,916	$4,735	$5,559	$ 0	$ 0
2022	Average FAP	$3,277	$3,602	$5,407	$6,684	$6,918	$6,980	$ 0	$ 0
2022	Current Retirees	4	3	1	5	43	3	0	0
2023	Average Benefit	$ 625	$1,120	$2,347	$3,550	$4,848	$6,252	$ 0	$ 0
2023	Average FAP	$3,142	$4,043	$5,761	$6,302	$7,003	$7,819	$ 0	$ 0
2023	Current Retirees	8	2	2	5	52	6	0	0

FAP = Final Average Pay

Civilian Patrol

By Years of Service

Retired In Fiscal Year		0 – 10	11 – 15	16 – 20	21 – 25	26 – 30	31 – 35	36 – 40	41+
2014	Average Benefit	$ 346	$ 647	$1,161	$1,945	$2,815	$2,341	$ 0	$ 0
2014	Average FAP	$2,319	$2,830	$2,505	$3,580	$3,792	$3,105	$ 0	$ 0
2014	Current Retirees	9	11	7	7	13	3	0	0
2015	Average Benefit	$ 340	$ 684	$1,375	$1,572	$2,341	$3,803	$ 0	$ 0
2015	Average FAP	$2,335	$2,586	$3,273	$3,453	$3,831	$4,911	$ 0	$ 0
2015	Current Retirees	11	11	5	13	12	6	0	0
2016	Average Benefit	$ 189	$ 614	$1,017	$1,872	$2,609	$4,869	$ 0	$ 0
2016	Average FAP	$2,457	$2,521	$2,989	$3,585	$3,820	$5,718	$ 0	$ 0
2016	Current Retirees	6	7	5	7	15	1	0	0
2017	Average Benefit	$ 340	$ 714	$1,347	$1,543	$2,623	$3,448	$3,435	$ 0
2017	Average FAP	$2,614	$2,712	$3,460	$3,301	$4,270	$4,425	$3,919	$ 0
2017	Current Retirees	7	5	7	13	18	5	1	0
2018	Average Benefit	$ 199	$ 731	$1,155	$1,959	$2,703	$2,768	$5,970	$ 0
2018	Average FAP	$1,955	$3,030	$3,452	$4,002	$3,996	$3,379	$7,510	$ 0
2018	Current Retirees	3	6	6	7	11	4	1	0
2019	Average Benefit	$ 463	$ 803	$ 920	$1,573	$2,349	$3,117	$ 0	$ 0
2019	Average FAP	$3,035	$3,094	$3,111	$3,228	$3,507	$3,912	$ 0	$ 0
2019	Current Retirees	4	6	6	6	6	5	0	0
2020	Average Benefit	$ 370	$ 532	$1,124	$1,833	$2,710	$2,521	$ 0	$4,123
2020	Average FAP	$2,804	$2,638	$3,176	$3,711	$4,141	$3,125	$ 0	$4,079
2020	Current Retirees	5	4	7	9	15	2	0	1
2021	Average Benefit	$ 249	$ 595	$1,064	$1,845	$3,229	$2,664	$ 0	$ 0
2021	Average FAP	$2,326	$2,991	$3,626	$3,575	$4,754	$3,188	$ 0	$ 0
2021	Current Retirees	9	10	10	11	9	1	0	0
2022	Average Benefit	$ 371	$ 605	$ 912	$1,794	$2,939	$3,908	$2,656	$ 0
2022	Average FAP	$2,980	$2,703	$3,131	$3,573	$4,430	$5,575	$3,411	$ 0
2022	Current Retirees	11	9	10	18	15	6	2	0
2023	Average Benefit	$ 390	$ 608	$ 959	$1,809	$3,442	$1,879	$ 0	$ 0
2023	Average FAP	$3,170	$2,908	$3,218	$3,834	$5,385	$2,846	$ 0	$ 0
2023	Current Retirees	7	12	7	9	12	1	0	0

FAP = Final Average Pay

MPERS

By Years of Service

Retired In Fiscal Year		0 – 10	11 – 15	16 – 20	21 – 25	26 – 30	31 – 35	36 – 40	41+
2015	Average Benefit	$ 0	$ 0	$ 0	$ 0	$ 0	$ 3,367	$ 0	$ 0
2015	Average FAP	$ 0	$ 0	$ 0	$ 0	$ 0	$ 4,764	$ 0	$ 0
2015	Current Retirees	0	0	0	0	0	1	0	0
2016	Average Benefit	$ 0	$ 0	$ 0	$4,143	$ 0	$ 0	$ 0	$ 0
2016	Average FAP	$ 0	$ 0	$ 0	$9,414	$ 0	$ 0	$ 0	$ 0
2016	Current Retirees	0	0	0	1	0	0	0	0
2020	Average Benefit	$ 0	$ 0	$ 0	$ 0	$ 0	$10,425	$ 0	$ 0
2020	Average FAP	$ 0	$ 0	$ 0	$ 0	$ 0	$12,079	$ 0	$ 0
2020	Current Retirees	0	0	0	0	0	1	0	0
2023	Average Benefit	$ 0	$ 0	$ 0	$ 0	$ 0	$ 3,957	$ 0	$ 0
2023	Average FAP	$ 0	$ 0	$ 0	$ 0	$ 0	$ 4,644	$ 0	$ 0
2023	Current Retirees	0	0	0	0	0	1	0	0

Note: There were no retirements during the years not shown above.

FAP = Final Average Pay

	MoDOT		Patrol		MPERS		Total	
	Employees	%	Employees	%	Employees	%	Employees	%
2014	5,041	67.98	2,357	31.79	17	0.23	7,415	100.00
2015	4,993	67.72	2,364	32.06	16	0.22	7,373	100.00
2016	5,059	67.70	2,398	32.09	16	0.21	7,473	100.00
2017	5,056	67.86	2,379	31.93	16	0.21	7,451	100.00
2018	5,065	68.31	2,334	31.48	16	0.21	7,415	100.00
2019	5,081	68.51	2,318	31.26	17	0.23	7,416	100.00
2020	5,031	68.59	2,287	31.18	17	0.23	7,335	100.00
2021	4,913	68.29	2,263	31.46	18	0.25	7,194	100.00
2022	4,629	67.52	2,209	32.22	18	0.26	6,856	100.00
2023	4,435	66.97	2,168	32.74	19	0.29	6,622	100.00

Data for this chart is as of June 30, 2023.

By Age

Closed Plan

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
<21	0	0	0	0	0
21 – 25	0	0	0	0	0
26 – 30	0	0	0	0	0
31 – 35	0	0	0	0	0
36 – 40	0	0	0	0	0
41 – 45	80	56	13	10	1
46 – 50	371	223	36	112	0
51 – 55	497	302	48	144	3
56 – 60	235	171	38	26	0
61 – 65	96	78	18	0	0
66+	20	15	5	0	0
Total	**1,299**	**845**	**158**	**292**	**4**
Average Age		**53**	**53**	**51**	**50**

Year 2000 Plan

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
<21	0	0	0	0	0
21 – 25	0	0	0	0	0
26 – 30	0	0	0	0	0
31 – 35	62	28	10	24	0
36 – 40	335	190	46	97	2
41 – 45	500	284	83	130	3
46 – 50	356	235	48	72	1
51 – 55	297	220	54	21	2
56 – 60	232	183	43	5	1
61 – 65	105	89	16	0	0
66+	24	22	2	0	0
Total	**1,911**	**1,251**	**302**	**349**	**9**
Average Age		**48**	**47**	**42**	**46**

Year 2000 Plan – 2011 Tier

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
<21	32	28	4	0	0
21 – 25	377	234	62	80	1
26 – 30	680	403	115	161	1
31 – 35	652	383	105	164	0
36 – 40	426	316	61	48	1
41 – 45	308	242	51	15	0
46 – 50	267	214	47	4	2
51 – 55	279	218	57	4	0
56 – 60	230	181	48	1	0
61 – 65	140	106	33	0	1
66+	21	14	7	0	0
Total	**3,412**	**2,339**	**590**	**477**	**6**
Average Age		**39**	**39**	**30**	**41**

By Years of Service

Closed Plan

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
<01	0	0	0	0	0
01 – 05	3	2	0	1	0
06 – 10	3	2	1	0	0
11 – 15	25	15	9	1	0
16 – 20	14	12	1	1	0
21 – 25	453	323	57	72	1
26 – 30	604	346	64	192	2
31 – 35	151	107	19	24	1
36 – 40	35	29	5	1	0
41 – 45	8	7	1	0	0
46+	3	2	1	0	0
Total	**1,299**	**845**	**158**	**292**	**4**
Average Service		**27**	**26**	**27**	**27**

Year 2000 Plan

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
<01	14	11	3	0	0
01 – 05	38	33	4	1	0
06 – 10	70	51	18	1	0
11 – 15	543	325	95	118	5
16 – 20	897	586	131	177	3
21 – 25	346	244	51	50	1
26 – 30	3	1	0	2	0
31 – 35	0	0	0	0	0
36 – 40	0	0	0	0	0
41 – 45	0	0	0	0	0
46+	0	0	0	0	0
Total	**1,911**	**1,251**	**302**	**349**	**9**
Average Service		**17**	**16**	**17**	**16**

Year 2000 Plan – 2011 Tier

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
<01	470	331	100	37	2
01 – 05	1,699	1,226	255	217	1
06 – 10	1,137	762	201	171	3
11 – 15	105	19	34	52	0
16 – 20	0	0	0	0	0
21 – 25	1	1	0	0	0
26 – 30	0	0	0	0	0
31 – 35	0	0	0	0	0
36 – 40	0	0	0	0	0
41 – 45	0	0	0	0	0
46+	0	0	0	0	0
Total	**3,412**	**2,339**	**590**	**477**	**6**
Average Service		**4**	**4**	**5**	**5**

By Age

Closed Plan

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
<21	0	0	0	0	0
21 – 25	0	0	0	0	0
26 – 30	0	0	0	0	0
31 – 35	0	0	0	0	0
36 – 40	0	0	0	0	0
41 – 45	49	42	6	1	0
46 – 50	199	162	22	14	1
51 – 55	321	235	27	59	0
56 – 60	216	192	24	0	0
61 – 65	56	50	6	0	0
66+	1	1	0	0	0
Total	**842**	**682**	**85**	**74**	**1**
Average Age		**53**	**53**	**51**	**46**

Year 2000 Plan

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
<21	0	0	0	0	0
21 – 25	0	0	0	0	0
26 – 30	0	0	0	0	0
31 – 35	30	21	4	5	0
36 – 40	209	153	31	25	0
41 – 45	285	221	46	18	0
46 – 50	236	201	19	16	0
51 – 55	161	136	22	3	0
56 – 60	84	73	10	1	0
61 – 65	22	19	3	0	0
66+	0	0	0	0	0
Total	**1,027**	**824**	**135**	**68**	**0**
Average Age		**46**	**45**	**42**	**0**

Year 2000 Plan – 2011 Tier

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
<21	0	0	0	0	0
21 – 25	0	0	0	0	0
26 – 30	64	53	6	5	0
31 – 35	113	73	18	21	1
36 – 40	66	50	9	7	0
41 – 45	33	27	1	5	0
46 – 50	35	28	5	2	0
51 – 55	33	25	7	1	0
56 – 60	18	14	4	0	0
61 – 65	12	9	3	0	0
66+	1	1	0	0	0
Total	**375**	**280**	**53**	**41**	**1**
Average Age		**39**	**41**	**35**	**34**

By Years of Service

Closed Plan

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
<01	0	0	0	0	0
01 – 05	109	79	16	14	0
06 – 10	344	270	34	39	1
11 – 15	215	181	22	12	0
16 – 20	121	109	9	3	0
21 – 25	46	36	4	6	0
26 – 30	7	7	0	0	0
31 – 35	0	0	0	0	0
36 – 40	0	0	0	0	0
41 – 45	0	0	0	0	0
46+	0	0	0	0	0
Total	**842**	**682**	**85**	**74**	**1**
Average Service		**11**	**10**	**9**	**8**

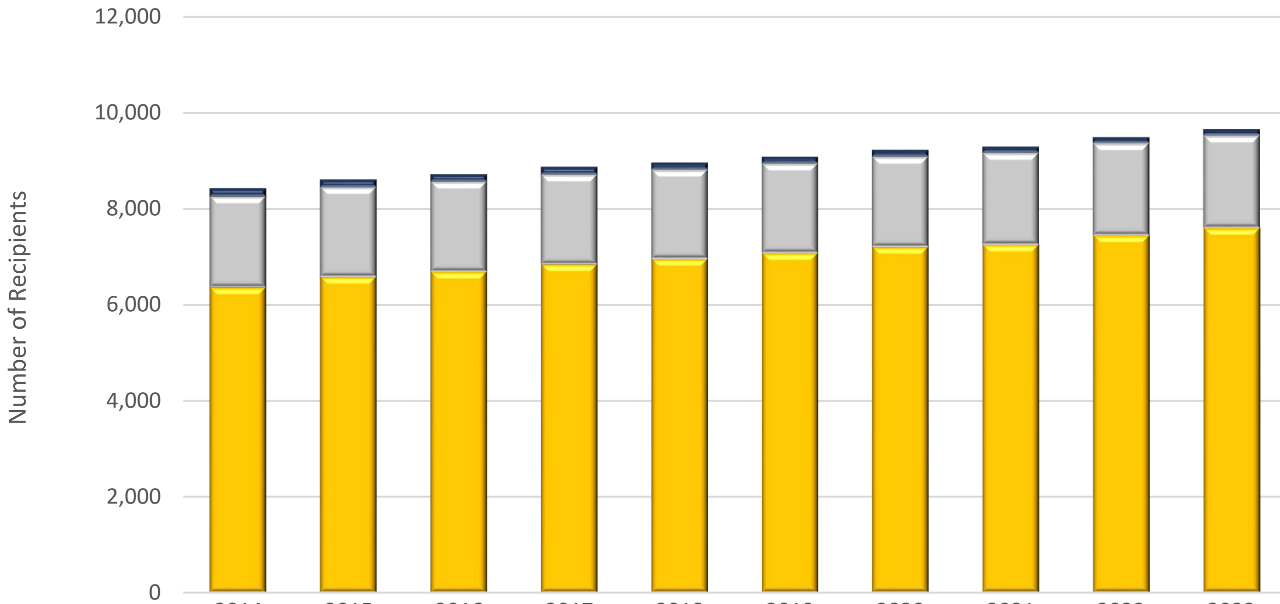
Year 2000 Plan

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
<01	0	0	0	0	0
01 – 05	109	89	17	3	0
06 – 10	541	436	67	38	0
11 – 15	283	221	42	20	0
16 – 20	82	67	8	7	0
21 – 25	12	11	1	0	0
26 – 30	0	0	0	0	0
31 – 35	0	0	0	0	0
36 – 40	0	0	0	0	0
41 – 45	0	0	0	0	0
46+	0	0	0	0	0
Total	**1,027**	**824**	**135**	**68**	**0**
Average Service		**10**	**10**	**10**	**0**

Year 2000 Plan – 2011 Tier

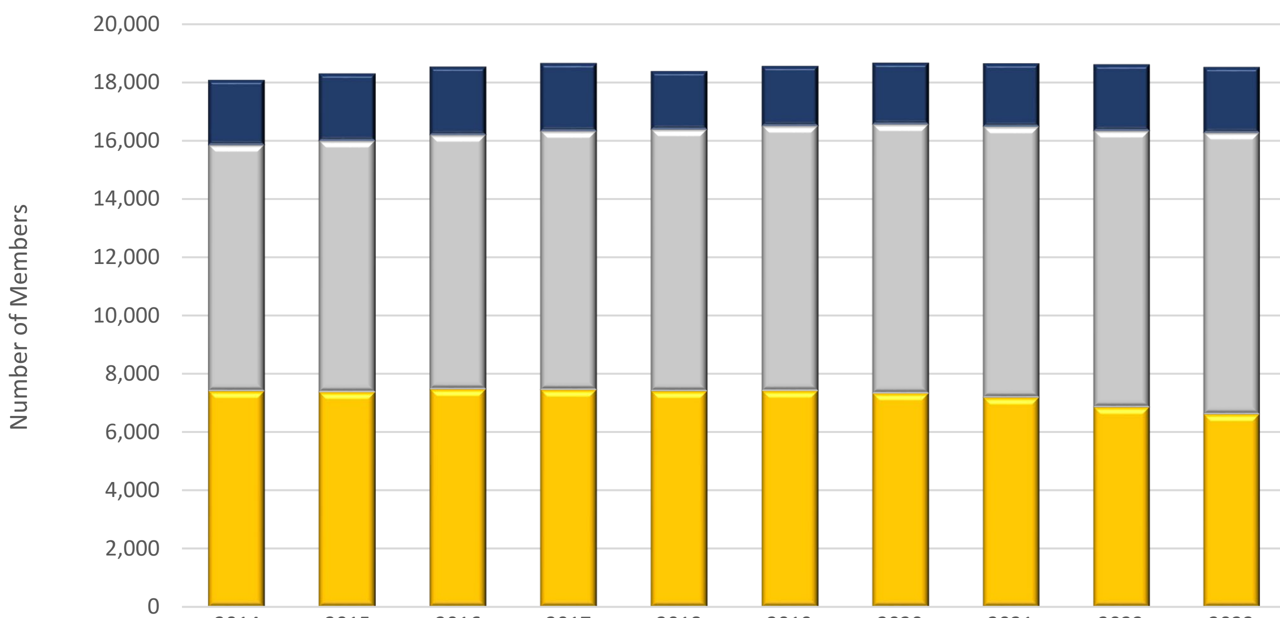
Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
<01	0	0	0	0	0
01 – 05	144	112	19	13	0
06 – 10	225	166	32	26	1
11 – 15	6	2	2	2	0
16 – 20	0	0	0	0	0
21 – 25	0	0	0	0	0
26 – 30	0	0	0	0	0
31 – 35	0	0	0	0	0
36 – 40	0	0	0	0	0
41 – 45	0	0	0	0	0
46+	0	0	0	0	0
Total	**375**	**280**	**53**	**41**	**1**
Average Service		**6**	**6**	**7**	**7**

Benefit Recipients



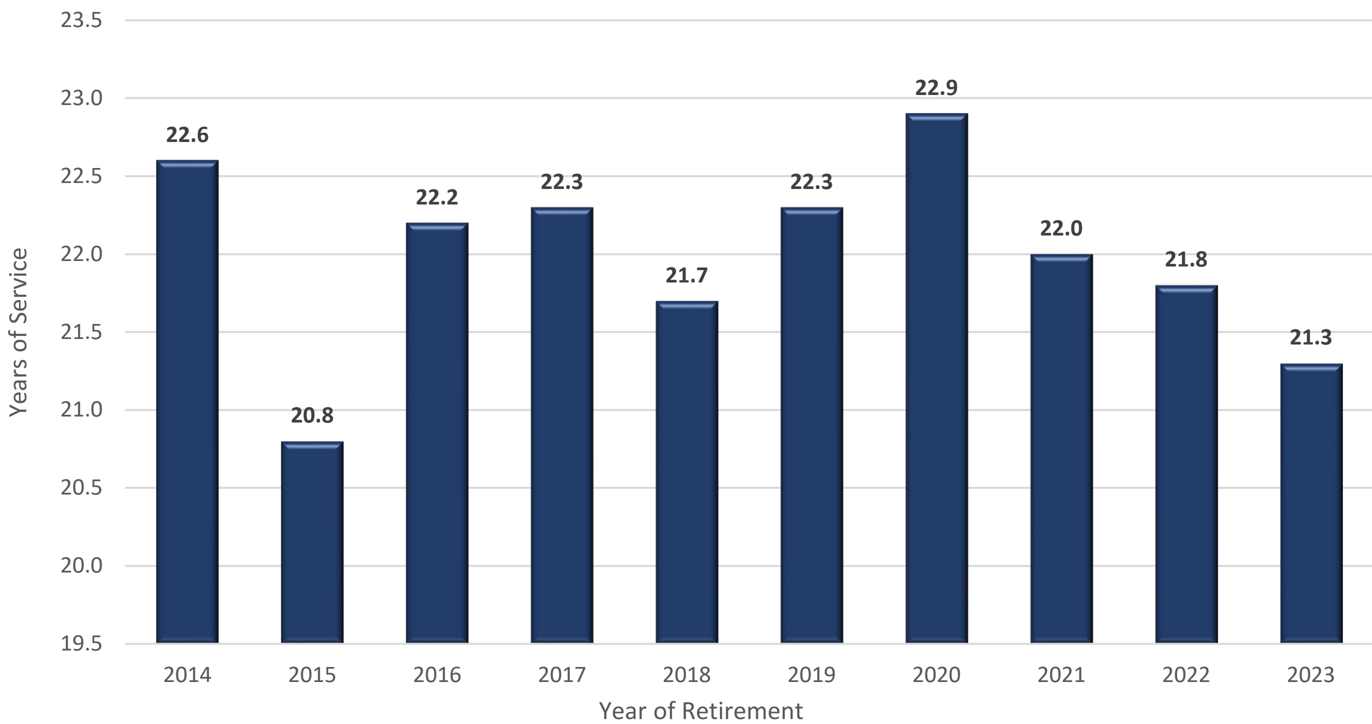
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Disabilities	173	164	155	155	148	143	139	128	124	127
Survivors	1,900	1,874	1,882	1,875	1,863	1,866	1,879	1,909	1,918	1,926
Retirees	6,365	6,583	6,690	6,846	6,956	7,077	7,208	7,254	7,444	7,597

Membership Distribution

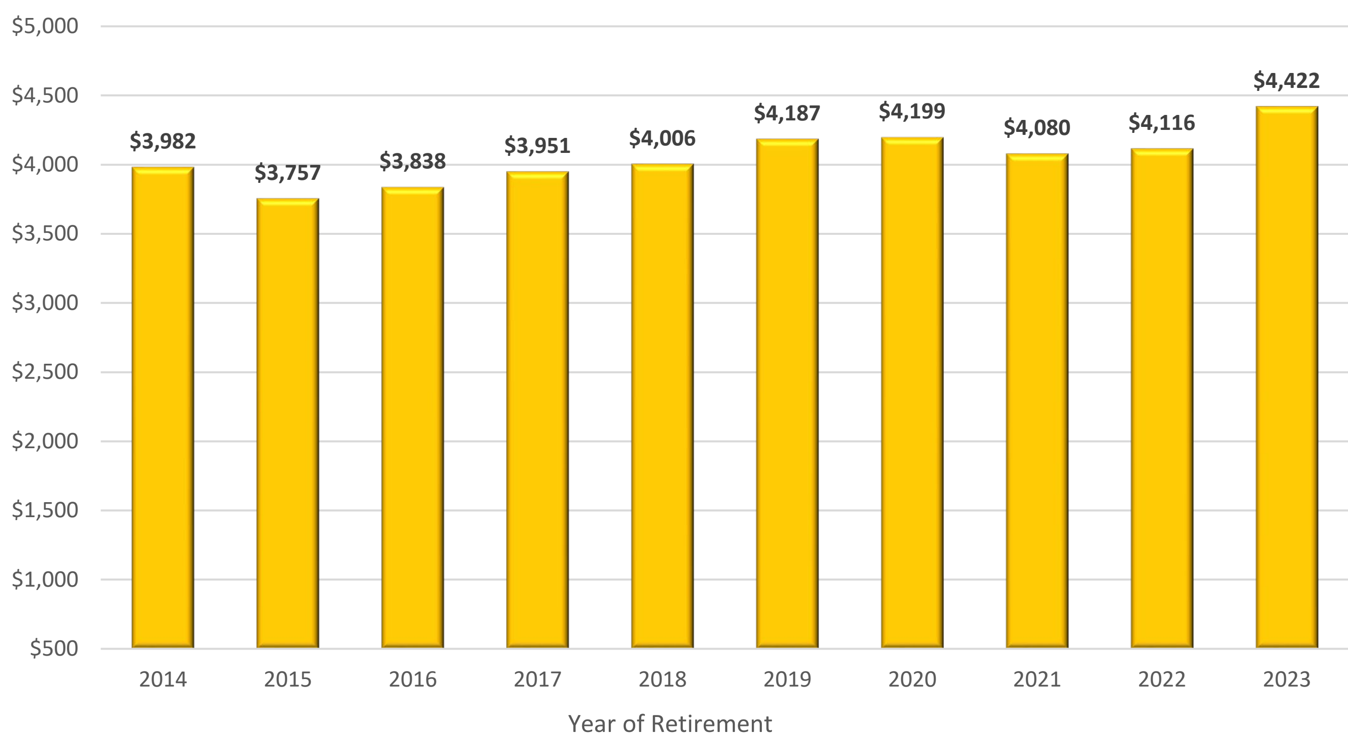


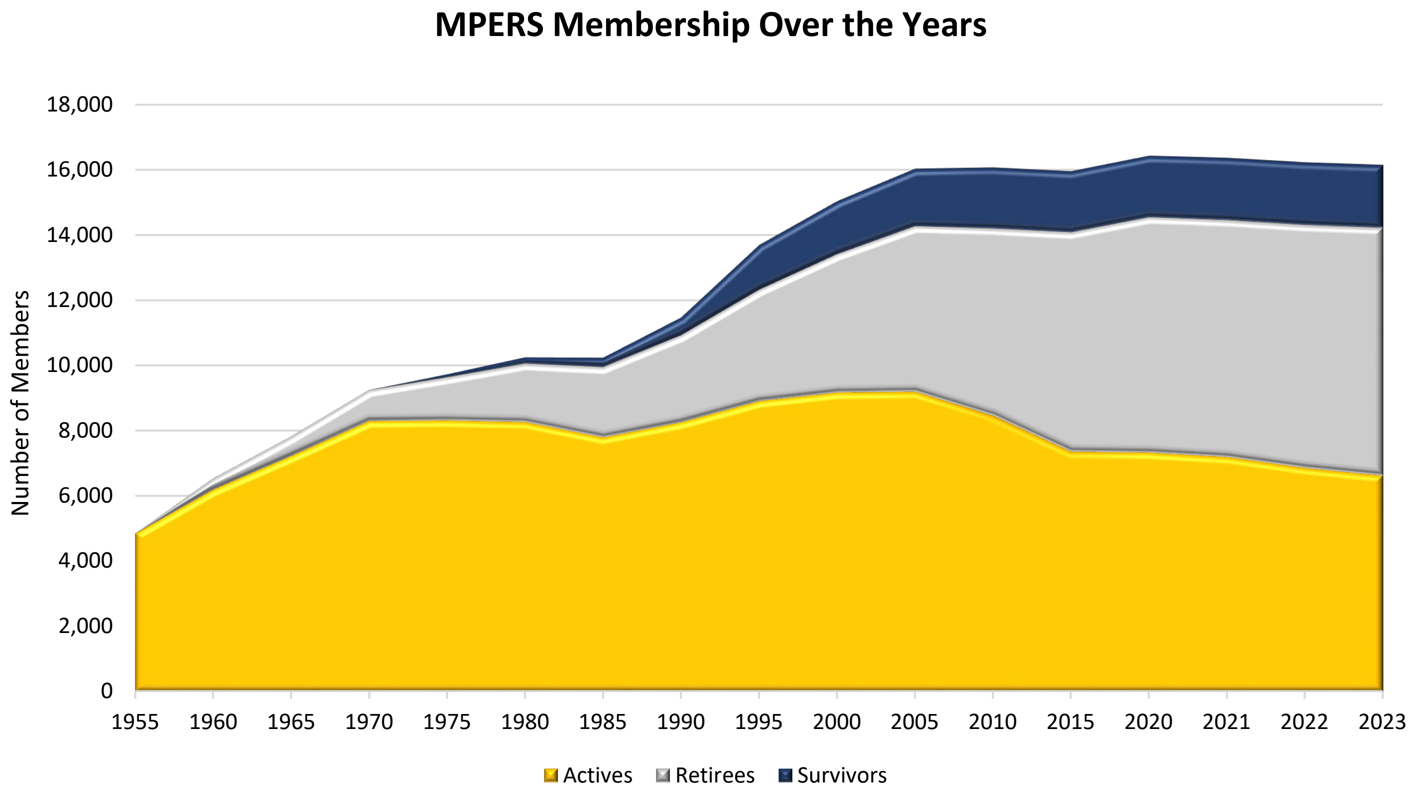
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Term. Vested Members	2,222	2,300	2,329	2,319	1,985	2,051	2,099	2,153	2,256	2,244
Benefit Recipients	8,438	8,621	8,727	8,876	8,967	9,086	9,226	9,291	9,486	9,650
Active Members	7,415	7,373	7,473	7,451	7,415	7,416	7,335	7,194	6,856	6,622

Average Years of Service for New Retirees



Final Average Pay for New Retirees




MPERS Membership Over the Years
Number of Members
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2021
2022
2023
Actives
Retirees
Survivors

This map represents the demographic distribution of retirees by state and country as of June 30, 2023.